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A TREATISE

ON THE

DISEASES OF THE CHEST,

&c. &c.

A TREATISE

ON THE

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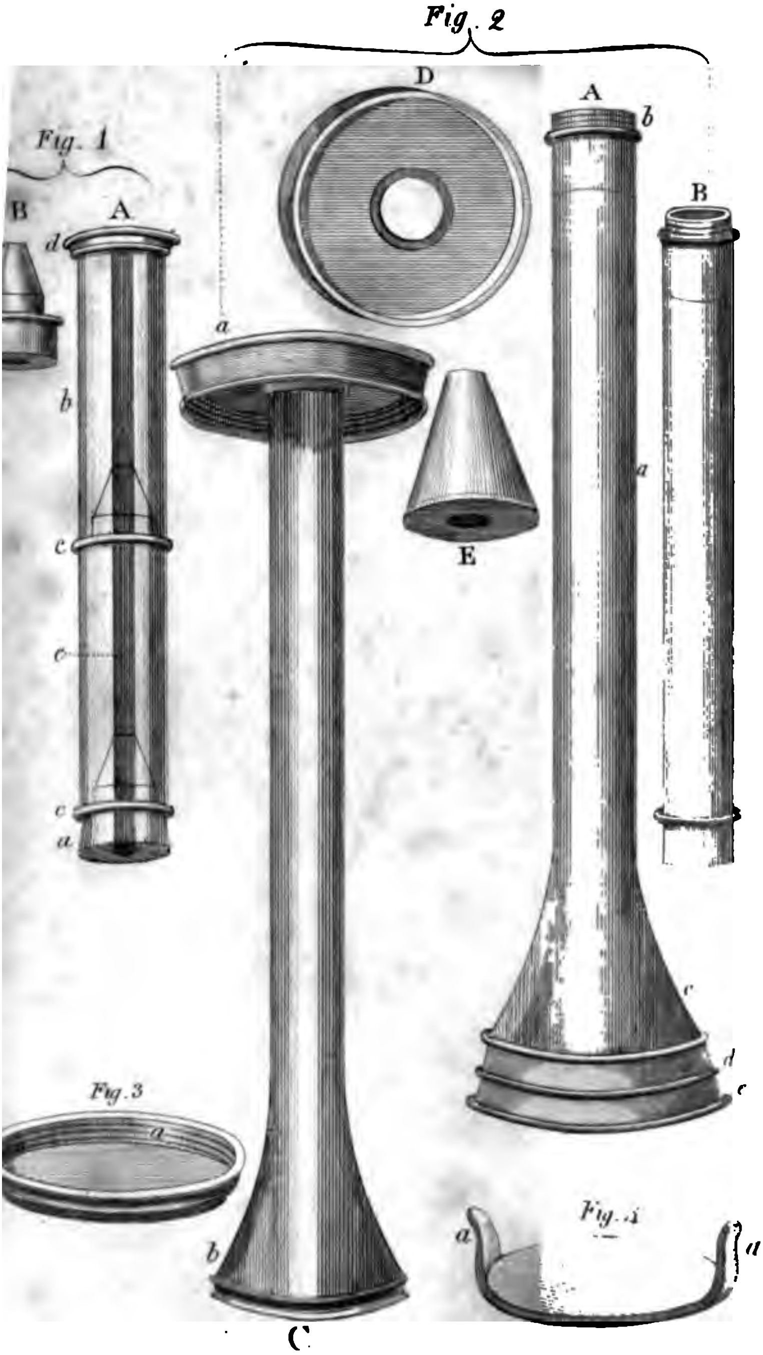
&c. &c.

BIBLIOTHECA·BODLEIANA

PLATE II



A TREATISE

ON THE

DISEASES OF THE CHEST

AND ON

MEDIATE AUSCULTATION,

BY R. T. H. LAENNEC, M.D.

REGIUS PROFESSOR OF MEDICINE IN THE COLLEGE OF FRANCE, CLINICAL PROFESSOR
TO THE FACULTY OF MEDICINE OF PARIS,
&c. &c. &c.

TRANSLATED FROM THE LATEST FRENCH EDITION,

WITH

COPIOUS NOTES AND A SKETCH OF THE AUTHOR'S LIFE,

BY JOHN FORBES, M.D. F.R.S.

MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS, PHYSICIAN TO THE CHICHESTER
INFIRMARY, AND PHYSICIAN IN ORDINARY TO HIS ROYAL HIGHNESS
THE DUKE OF CAMBRIDGE.

FOURTH EDITION,

CONSIDERABLY ENLARGED AND IMPROVED, WITH MANY ADDITIONAL NOTES
AND AN EXTENSIVE BIBLIOGRAPHY OF THE DIFFERENT DISEASES.

With Plates.

Μέγα δὲ μέρος ἡγεῦμαι τῆς τέχνης εἶναι τὸ δύνασθαι σκοπεῖν.—HIPPO

LONDON:
HENRY RENSHAW, 356, STRAND; LONGMAN, REES, ORME, BROWN,
GREEN, AND LONGMAN; WHITTAKER AND CO.;
AND SIMPKIN AND MARSHALL.
1834.

526.

Oh! while along the stream of time thy name
Expanded flies and gathers all its fame,
Say shall my little bark attendant sail,
Pursue the triumph and partake the gale?

LONDON:
IBOTSON AND PALMER, PRINTERS, SAVOY-STREET, STRAND.

TO

JAMES CLARK, M.D. F.R.S.

PHYSICIAN IN ORDINARY TO THEIR MAJESTIES THE KING AND QUEEN OF BELGIUM.

My dear friend,

The translation of the first edition of this Treatise was dedicated to our eminent friend, the late Dr. Baillie; and although there remain among his successors, many whose names would do honour to it in its present much improved form, there is no one who has equal claims with yourself to this address.

Possessed of the most extensive and accurate knowledge of pathology, and of a rare sagacity in discriminating the minuter shades of diseases, you are in a more especial manner qualified to judge of the merits of the present work, by your perfect acquaintance with the affections of which it treats, and by your constant and successful practice of the diagnostic measures recommended in it. It was, moreover, in your valuable *Notes on the climate, diseases, hospitals, and medical schools of France and Italy,* that the transcendent merits of M. Laennec's work were first made known in this country; it was at your earnest recommendation and request that I undertook the translation of it; it was by your precept and example that I was led to practise the new methods of diagnosis therein detailed: it is to you, therefore, in a great measure, that the profession is indebted for any benefits, however slight, that may have resulted from my humble labours.

But you have a claim to this address, of more weight with me than your professional talents and character, however distinguished, and the acknowledgment of which, I flatter myself, will be more acceptable to you than any homage I could offer on public grounds—I mean, the friendship with which you have favoured me for so many years, and to which I am so much indebted.

That you may long live for the honour and interests of our common profession, and for the welfare and happiness of your friends, is my sincere and warmest wish.

JOHN FORBES.

Chichester, Oct. 1, 1827.

TRANSLATOR'S PREFACE

TO THE SECOND EDITION.

WITH all its imperfections as a translation, I have no hesitation in pronouncing the following work to be one of the most valuable that has ever been presented to the medical profession in this country. The original Treatise will remain an imperishable monument of the genius and industry of the author; and the discovery of which it treats, will entitle him to a distinguished rank among the benefactors of mankind. As a standard work on the pathology and diagnosis of the diseases of the chest, it is not only without an equal, but may be considered as almost perfect in its kind. Much, no doubt, will hereafter be discovered that will modify and improve the delineations of disease which he has left us, but their great outlines must remain, unalterable as nature itself.

To be convinced of the vast importance of auscultation as a means of diagnosis, it is only necessary to peruse the present treatise; and I can offer no more powerful incentive to the reader, than to add my humble testimony in support of every statement contained in it, which I have had an opportunity of verifying. Several forms of disease there recorded, have not, as yet, come under my observation, and in some of the more common affections, I have not hitherto had occasion to notice every one of the signs described; but in no case have I met with any circumstance, either of a positive or negative kind, which could give me the slightest reason to doubt any essential parts of the author's statements.

At the same time, it would be exacting too much from the weakness of humanity, to expect, that the author of *Mediate Auscultation* should, in no case, have yielded to the enthusiasm naturally inspired by the consciousness of so great a discovery. And if, in a few passages of his book, he should be found somewhat to exaggerate the actual or relative importance of his method, or even sometimes to appear rather as the partisan than the historian of the stethoscope, I am sure that a fault so venial, on such an occasion, and in such a man, ought not to be visited by heavy censure. Indeed, I am convinced that every unprejudiced reader, qualified by the study and practice of auscultation to judge of the character of his work, (and none else are qualified,) must confess that the author stands in need of less indulgence on this point than could have been expected; certainly less than every candid and honourable mind will be ready to concede.

To estimate fairly the correctness of M. Laennec's statements, we ought, also, to take into account his vast experience, and his unequalled practical tact, which was the admiration of every one who had opportunities of observing his examinations. In no case, even the most obscure, did he shrink from pronouncing his opinions, and fixing his diagnosis; and rarely indeed was he mistaken. These circumstances ought to make his successors long hesitate before they call in question the correctness of his statements, even although they should fail to verify them, by repeated experience; and incline them rather to doubt their own capacity in exploring, and the accuracy or acuteness of their perceptive powers, than the fidelity of the records which he has bequeathed to them.

And here I think it necessary to state, in the most distinct and unequivocal terms, that although nothing is easier than for any one to acquire sufficient evidence of the truth and powers of *Auscultation*, it is only by long and painful trials, (*inter tædia et labores*, as Auenbrugger says of his congenerous discovery,) that any useful practical knowledge of it can be acquired. When, therefore, we hear, as we sometimes do, that certain persons have *tried the stethoscope*, and abandoned it upon finding it useless or deceptive; and when we learn, on inquiry, that *the trial* has extended merely to the hurried examination of a few cases, within the period of a few days or weeks; we can only regret that such students should have been so misdirected, or should have so misunderstood the fundamental principles of the method. No conclusions deduced from such attempts—I cannot dignify them with the term experience,—can have any weight with those qualified to judge in the matter; they can only be added to the heap of *false facts*, as they have been called, with which medicine, and indeed every department of human knowledge, is overlaid, and which are the characteristic and ready offspring of minds too feeble to be habitually conversant with general principles, and too narrow to embrace all the more important relations of the objects of their inquiry.

I am ready and willing to concede, that this difficulty of attaining a complete practical knowledge of *Auscultation* is one of the greatest drawbacks to its value; as it will ever prevent the indolent and careless from making themselves masters of it. But I will venture to add, that no one who has once mastered its difficulties, and who cultivates his profession in that spirit which its high importance and dignity demand, will ever regret the pains taken to overcome them, or willingly forego the great advantages which he has thereby acquired.

It must not be supposed from any thing I have stated, that I am inclined to consider the methods of diagnosis discovered by Auenbrugger and Laennec as all in all; as not only unerring in their nature, but also sufficient for practical purposes, without any aid from the common and general symptoms of diseases. So far is this from being the case, that I deem it necessary in this place, to repeat, what I have substantially declared in several of the notes appended to the work, that such a doctrine is both false and dangerous. In science, as well as in religion and politics, over-zealous and injudicious friends are often more injurious to the cause they advocate, than its most determined enemies; and in regard to auscultation, I am convinced that the most certain mode of preventing its general adoption, is to attempt to extend it beyond its just limits, or to raise its credit at the expense of other methods in more general use, which have not merely the sanction of the experience of ages, but the still stronger support of deep-rooted prejudice, in their favour. So far, indeed, am I from advocating its exclusive use, that (with some exceptions) I would lay it down as a general rule, that the physician ought, in the first place, to endeavour to ascertain the nature and state of the disease by the common symptoms alone, and that it should be only had recourse to afterwards, as a sort of *experimentum crucis*, to fortify his convictions in obvious cases, or remove his doubts in difficult ones. In every case, however, of doubt or difficulty, or even simply of danger, I consider the use of the stethoscope as indispensable. In the great majority of such instances, it will, at once, remove all obscurity and difficulty; in every case it will communicate to the mind of the practitioner a degree of certainty, and consequent satisfaction and comfort, which no combination of mere symptoms can inspire, and which will, in most cases, have a beneficial influence on the future treatment.

The best proof of the value of *Auscultation* is, however, found in the great progress which the practice has made in every country of Europe, as is sufficiently evinced by the medical publications of the last few years. There is, indeed, hardly any one of the civilized nations of the world, which cannot now afford examples of its acknowledged utility, either in its publications or in the practice of its medical professors. France, as might be expected, has taken the lead in this respect. The records of her medical literature can already boast of several works not unworthy of coming after the *Treatise on Auscultation*; and in the ranks of her most eminent practitioners, are several well qualified by their zeal and their practical skill, to succeed its lamented author. As claiming especial notice in this respect, I must mention the extremely valuable works of MM. Andral, Louis and Bertin, so frequently referred to in my notes. Of the same class and character as the treatises of Corvisart, Bayle and Laennec, these volumes are (with many others which could be named) splendid proofs of the great superiority of the French pathologists over those of any other country in Europe, and entitle their authors to the highest praise for zeal, industry, and accuracy of research. The work of M. Andral, more especially, is fraught with the most important information respecting *Auscultation*.

At the time of the publication of my Collection of Cases, now nearly four years since, I took occasion to lament the little progress made by the new methods of diagnosis in this country; but I have reason to believe that they were at that time practised to a greater extent than I was then aware of. Certain it is, that since the period alluded to, our medical literature has borne sufficient testimony to their increased and increasing progress; while I have learned from other sources, how extensively and accurately they are practised by many physicians and surgeons, of distinguished talents, in England, Scotland, and Ireland.*

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* See the Bibliographical notice on Auscultation at the end of the volume.

But, perhaps, the most striking tribute rendered to *Mediate Auscultation*, in this or any other country, and one which seems likely to be productive of the most important results, is that for which it is indebted to the present enlightened Director General of the medical department of the British army. In a letter with which I was honoured by Sir James Macgrigor, on the publication of my Collection of Cases illustrating the use of the Stethoscope and Percussion, he informed me that he had given general directions to the medical officers of the army to make trial of the new methods, and to report the result. I have also learnt from my friend Sir William Burnett, the Physician of the Navy, that no opportunity is lost in that department of the public service, in recommending the use of the stethoscope.

The translation now presented to the public, I wish to be considered as *complete*, in as far as regards the chief subject of the treatise. The Cases, however, needlessly and uselessly diffuse in the original, I have, in almost every instance, abridged. In different parts of the work, also, I have here and there omitted a few passages which seemed to have no necessary, or at least useful connexion with the subject of it. The whole of the Treatise, indeed, I have endeavoured, not to abridge but to condense, by the use of as concise a mode of expression as possible: and if I have succeeded in my intentions, my translation, I flatter myself, will be more valuable than if it had been strictly literal; a good deal of the original being written in a diffuse and verbose style by no means commendable in a work of science. By these means, and by the use of a much larger page and closer form of printing, I have been enabled to comprehend the whole in one volume, containing only about the same number of pages as one of the two volumes of the original.

Having taken considerable pains to be accurate during the process of translation, and having scrupulously revised the sheets before going to press, with the original in my hand, I hope it will be found that my version is, at least, faithful. If, in addition, I have succeeded generally (I do not flatter myself to have done so always) in presenting the sense of my author in tolerably good English, in spite of the unfavourable influence of a foreign idiom constantly before me, I have attained all that I had in view; and, indeed, almost all that the translator of a scientific work could desire. It is only in the department of polite

PREFACE

TO THE FOURTH EDITION.

In once more presenting the great work of Laennec to the members of the medical profession in this country, it is gratifying to me to be able to state that they will, in my opinion, find it very considerably improved in this the Fourth Edition. The text is enlarged by the addition of numerous short passages and several entire cases, not translated in the former editions; while the style of the whole has been carefully examined, and altered where it seemed to require amendment.

During the six years which have elapsed since the publication of the last edition, much has been done to increase our knowledge of the pathology of diseases of the chest, and to improve the means of their successful investigation; and it has been my duty, as annotator and commentator, to put the reader in possession of all such improvements as were known to me, and seemed likely to be useful or interesting to him. The great mass of additional matter in the notes will, at least, evince that I have not shrunk from the labour incident to this part of my task; and I trust that it will be found, on examination, that my efforts have not been altogether misdirected or barren of useful results.

In accomplishing my task I have derived great advantage from the notes appended by Dr. Meriadec Laennec to the new Parisian edition of his cousin's Treatise.* All of these which possessed either pathological or practical interest, I have translated; but I have left nearly untouched the very copious annotations which he has appended to various chapters under the head of *Recapitulation of the Auscultatory Signs.* This I have done, partly, because these recapitulations, although excellent in themselves, are, as their name implies, mere repetitions of statements already given in the text, and partly, because they have already appeared in our language in a separate form.†

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* Traite' de l'Auscultation, &c. Troisième Edition, Augmentée de Notes, par Meriadec Laennec, D.M.P. ancien chef de Clinique de la Faculté de Médecine, Médecin de Dispensaires, &c. Paris, 1831. 3 vols. 8vo.

† A Manual of Percussion and Auscultation. Composed from the French of Meriadec Laennec. By J. B. Sharp. Lond. 1832. 12mo.

Numerous, however, and important as are the annotations derived from the industrious researches of my co-editor, and from the writings of Dr. M. Laennec's zealous and learned countrymen, my readers will find themselves under still greater obligations to the eminent pathologists of our own country who have, of late years, so successfully cultivated the fields of auscultation and thoracic pathology; and I must here in a more particular manner express my acknowledgments to my distinguished friends Drs. Carswell, Clark, Hope, Stokes, Townsend and Williams, from whose respective works, published in a distinct form, as well as from their numerous and elaborate communications to the Cyclopædia of Practical Medicine, I have derived so much valuable information. Dr. Hope's elaborate and excellent Treatise on the Diseases of the Heart, and Dr. Williams's scientific little work on the Signs of the Diseases of the Lungs and Pleura, have been of especial service to me; and I should not be doing justice to my sense of their importance if I did not strongly recommend them to all who are interested in the subject of the present Treatise.

Having, from these and other similar sources, and from the stores of my own experience, done my best, consistently with the prescribed limits of the work, to make good some original defects in the treatise, and to supply the wants which the progress of medical science has created since the date of its first publication, I would fain hope that the present edition may appear to competent judges, to present a tolerably accurate and complete view of the actual state of our knowledge of the Pathology, Diagnosis, and Treatment of Diseases of the Chest. I may, at least, venture to assure the reader that whatever is found defective in any of these particulars, will be supplied from the sources indicated in the bibliographical references, now for the first time appended to the different articles in the treatise.

I will only further add, in conclusion, and as an acknowledgment due to the Publisher, that notwithstanding the great quantity of additional matter, the expense of engraving new plates, and the superior typographical elegance of the work, it is offered to the profession at a price very considerably below that of the preceding editions.

J. F.

Chichester, Sept. 15, 1834.

LIFE OF THE AUTHOR.

René Théophile Hyacinthe Laennec was born at Quimper, in Lower Brittany, on the 17th February, 1781.* His father was an advocate in the provincial courts, and held some appointments under government, in his native county. He appears to have been a man of some talent, and is said to have possessed, along with the art of the poet, not a little of the instability and thoughtlessness often associated with that character. Fortunately his son was the heir of the more solid parts of his genius; without his wit, but without his volatility. At an early age he was committed to the charge of his uncle, his father's brother, a respectable ecclesiastic, at that time in charge of the parish of Elian, in the vicinity of Quimper. But the valuable superintendence of this gentleman was in a short time lost to young Laennec, first by the promotion of his uncle to an higher office in the church, and afterwards by his exile in the general proscription of the clergy, on the breaking out of the French Revolution. He was then transferred to the care of another uncle, Dr. Laennec of Nantes; a circumstance which, no doubt, gave the colour to his subsequent life, and was the remote cause of all his future greatness. Dr. Laennec was a man of the highest respectability both as to talent and conduct, and directed the studies of his nephew with the interest and affection of a parent. The young scholar did credit to his friends and teachers; having obtained considerable distinction among his fellows at the chief school of the department of the Lower Loire, whither he had been sent by his uncle. Having completed his preparatory studies at this seminary, his thoughts naturally turned towards physic as a profession. He willingly engaged himself as the pupil of his uncle, and entered upon the study of his future profession with the zeal inherent in his character, and with success indicative of his subsequent eminence. Besides the instructions derived from his uncle, who was at that time senior physician of the hospital, and afterwards Professor of Medicine and Materia Medica at Nantes, he attended the courses of anatomy given by the surgeons of the same establishment, and is said, even at this early age, to have shown a decided predilection for morbid anatomy and clinical observation.

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* All the principal statements contained in this Sketch are derived from two short Memoirs of the Author's Life, published by MM. Kergaradec and Bayle, and from a MS. chiefly in the form of Notes on these, which I had the honour of receiving from Dr. Meriadec Laennec, the cousin and friend of the subject of the present notice.

Towards the close of the year 1799 he was for a short period engaged in the public service, and officiated as assistant surgeon in the military hospitals at that time established at Nantes: he likewise attended, in this capacity, the detachment of *The Army of the West*, which marched into *The Morbihan*, to quiet the troubles at that time prevalent there. In the following year, having resigned his temporary appointment in the army, he went to Paris, in order to complete his medical education. He immediately attached himself to the clinical school of *La Charité*, then under the direction of the celebrated Corvisart, whose notice and regard the active and zealous student had soon the good fortune to engage. Among his fellow-pupils at this time, was Bayle, afterwards so distinguished for his pathological researches, more especially in phthisis; and as he was Laennec's senior by several years, and moreover his personal friend, there is little doubt that his example must have had considerable weight in fixing the attention of the young student on his own favourite pursuit. Although attached in a more particular manner to the clinic of *La Charité*, Laennec attended the various medical lectures at that time delivered at *The School of Medicine;* and, as well by his talents and superior knowledge of the learned languages, as by his great zeal and assiduity in medical pursuits, he speedily attained a marked degree of distinction among the crowd of students then frequenting the Parisian hospitals. His remarkable industry at this period is best evinced by the fact, that during the first three years of his attendance as pupil of *La Charité*, he drew up a minute history of nearly four hundred cases of disease; and the talent and discrimination of the youthful reporter must appear equally conspicuous, when it is known that these very cases furnished the groundwork of all his future researches and discoveries. This fact (which I give on the authority of his cousin, Dr. Meriadec Laennec) ought to prove a stimulus to the industry of all students in their attendance on hospital practice, and should teach them, that to record every important case they meet with, is not only a most useful labour at the time, but may eventually lead, as in the case of the subject of this memoir, to results of the highest consequences to themselves and their profession. At an early period of his labours, he began to communicate some of their results to the public, and was honoured with signal marks of professional distinction. In the year 1802, being then in his twenty-first year, he published in the *Journal de Médecine*, at that time conducted by Corvisart, Leroux, and Boyer, several papers of singular merit; and likewise obtained the two chief prizes in medicine and surgery, granted by the Minister of the Interior, through the then Institute of France. His first paper consists of an interesting case of diseased heart, and appeared in the number for Messidor, an. x. (1802*). Two months later, in the same year (Fructidor, an x.) he published his *Histoires d'Inflammation du Peritoine*†, consisting of a series of cases detailed in a very clear and satisfactory manner, illustrated by much learned annotation, and terminated by general conclusions, specifying the anatomical character and signs of peritonitis in a more accurate manner than had been previously done. This memoir, which has the great merit of being six years anterior to the publication of Broussais's *Phlegmasies Chroniques*, is well worthy the attention of pathologists. It bears the impress of great learning and talent, and could not fail to give great promise of subsequent eminence in its youthful author. He appears, about the same time, to have commenced his career as a critic or reviewer, (a character in which he was afterwards conspicuous for many years,) as there appears in the same volume of the *Journ. de Méd.* (p. 565) a review of the French translation of Benjamin Bell's Treatise on the Venereal Disease, bearing (as is usual in France) the name of the reviewer, R. T. H. Laennec at its head.

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* Journ. de Méd. t. iv. p. 295.

† Ibid. p. 499.

In the same year he gave as striking a proof of his superior knowledge of natural anatomy, as he had previously done of his pathological knowledge in his Essay on Peritonitis, by the publication of his *Lettre sur les tuniques qui enveloppent certains viscères,* addressed to Dupuytren, then principal anatomist in the School of Medicine.[*] In this memoir his object was to describe more particularly than had been done before, peculiar tonic or certain viscera, particularly the liver, spleen, and kidney, seated beneath the peritoneal coat, and constituting the proper sheath of their vessels:—if we admit this tunic to be distinct from the cellular layer which unites the peritoneal to the parenchyma of the organs, we must consider Laennec as the discoverer of it. This paper, like all his earlier productions, is distinguished by much literary research, and a spirit of liberality towards his predecessors. About the same time he pointed out a mode whereby the lining membrane of the ventricles of the brain may be demonstrated, a thing which had been previously admitted only from analogy;[†] and described a synovial capsule, before unobserved, situated between the acromion process and top of the humerus.[‡] He likewise contributed several reviews to the same journal, of which he afterwards (in 1804) became chief editor, and continued to be so till 1809. In 1803, while still a student and a youth, he began a course of lectures on pathological anatomy, which he continued for three years, with considerable success; animated in his exertions not merely by his native zeal in the pursuit, but by a noble spirit of rivalry between himself and Dupuytren, who commenced a course of the same kind at the very same time. In February, 1804, he read a memoir on that variety of hydatids termed by him *Acephalocysts* before the Faculty of Medicine. A sketch of this memoir was published at the time in the first vol. of the *Bulletins de la Faculté,* p. 131, and was printed at length in their *Mémoires,* which have hitherto remained unpublished. On the 11th June, in the same year, he obtained his degree of Doctor *in Medicine.* His thesis, entitled "*Propositions sur la doctrine d'Hippocrate appliquée à la médecine-pratique,*" proved him, according to the expression of M. Bayle, to be no less skilled in the knowledge of the Greek language, than deeply read in the writings of the father of physic. M. Laennec was, indeed, always a great admirer of Hippocrates; and there are few of his writings in which this admiration is not strongly expressed. After his graduation, he entered formally upon the practice of medicine, and continued to devote himself to this and to his medical studies, until obliged by ill health to relinquish both. His constitution, naturally feeble, and predisposed to disease, was unequal to the labours he imposed upon himself; and as his private practice increased, he felt himself under the necessity of relinquishing some of his employments. Accordingly he discontinued his course of pathological anatomy in 1806. This course attracted considerable attention during its continuance, and was in some degree founded on the lecturer's own discoveries and researches. The arrangement of it was quite original, and indicated at once a clear and a comprehensive mind. It was long the intention of Laennec to publish a complete work on morbid anatomy, and he did not relinquish the idea of so doing for several years after the close of his course of lectures. The only portions of the work, however, which were ever completed have been subsequently published as separate articles in the *Dictionnaire des Sciences Médicales*, or in his *Traité de l'Auscultation*. A brief exposition of the classification adopted by him was read at the *Société de l'Ecole de Médecine*, in Jan. 1805 (6 Nivose, an. xiii.), and was afterwards published in the *Journ. de Méd.* t. ix. 360. Enlarged and somewhat altered, it subsequently formed the excellent but brief article, *Anatomie Pathologique*, contributed by him to the *Dict. des Sc. Méd.* (t. ii. p. 46.) Among other discoveries of the first years of his labours in the dissecting room, the morbid alterations named by him, *Encephaloid Cancer* and *Melanosis*, deserve particular notice for their importance. Both these are mentioned by him in the memoir read before the *School of Medicine*, in 1805; and although it is true that the former was previously well known in England, having been described by Burns in 1800, by Hey in 1803, and by Abernethy in 1804, the subject of our memoir appears to have been totally ignorant of this fact, and is, therefore, equally entitled with these gentlemen to the honour of having discovered it. Besides the articles mentioned, and numerous reviews which he published in the *Journ. de Méd.*, he read several papers before the Society of Medicine, and likewise communicated some valuable articles to the *Dict. des Sc. Méd.*, to which he had become one of the joint contributors. The articles written by him in this work are the following: *Anatomie Pathologique*, t. ii. p. 46; *Ascarides*, ibid. p. 339; *Cartilages Accidentels*, t. iv. p. 123; *Dégénération*, t. viii. p. 201; *Désorganization*, ibid. p. 536; *Detrachyceros*, t. x. p. 43; *Encéphaloide*, t. xii. p. 165; *Filaire*, t. xv. p. 493. This last article was published in 1816, and closed his connexion with that great but unequal work, from which he was called off by more urgent duties, and by one of the most brilliant and important discoveries that had ever illustrated practical medicine. Previously to this period, however, namely in the year 1814, it is deserving honourable mention, that he was one of the physicians who volunteered their services in one of the Parisian hospitals (*La Salpetrière*) at that time filled with sick and wounded soldiers. On this occasion, owing to his knowledge of the *Armorican* or *Breton* language, he had an opportunity of being particularly serviceable to some of his unfortunate countrymen. Among the young soldiers, who at that unhappy period crowded the hospitals, overwhelmed at once with bodily fatigue and distress of mind, there happened to be a great number of conscripts from Bretagne, who did not know one word of French, and whose sufferings, in consequence, were greatly and fatally aggravated by *nostalgia* of the worst description. These poor fellows were speedily congregated in the wards under the charge of Laennec; where they derived as much benefit from the care and kindness of their countryman, and from the delight of being understood and spoken to in their native language, as from the medical skill with which they were treated.

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[*] Journ. de Méd. t. v. p. 589, (Ventose, an. xi.)

[†] Journ. de Méd. t. v. p. 254.

[‡] Ibid. p. 442.

In 1816 Laennec was appointed chief physician to the Necker Hospital, the duties of which he undertook with his usual zeal and activity, and in which he was speedily rewarded for all his labours by his immortal discovery of Mediate Auscultation. It is surprising, as he himself observes, that this discovery had never been made before: especially as it is certain that Hippocrates was accustomed, in certain cases, to apply the ear to the chest, with the view of ascertaining the presence of water in this cavity; and the wonder becomes still greater, after the great analogous discovery of Avenbrugger. For some remarks on the practice of Hippocrates in this particular, I refer to the article on *Immediate Auscultation* in the following treatise; and for the author's own narrative of his discovery of Mediate Auscultation, I refer to page 5 of the Introduction. From the time of his discovery, M. Laennec appears to have devoted himself with astonishing perseverance to the perfection of the new system of diagnosis which he founded on it: and with a degree of success, and a fertility of results much more remarkable than the discovery itself, and indicative of the finest powers of invention, the truest characteristic of genius. In June 1818, that is, less than two years after the discovery, the author read a memoir before the Academy of Sciences, containing the outlines of his method; and in September of the following year he published the first edition of his immortal work, in two volumes octavo, under the title of *De l'Auscultation Médiate, ou Traité du Diagnostic des Maladies des poumons et du Cœur, fondé principalement sur ce nouveau moyen d'exploration*.

The labour necessary to perfect his discovery and to compose his Treatise, was nearly fatal to the author; and he was under the necessity of breaking through all his engagements, and retiring to the country, within a month after the publication of his work. This was at first received by the profession with considerable distrust; and the new mode of diagnosis, and especially the instrument, was attempted to be turned into ridicule. Indeed, but for the admirable descriptions of the diseases contained in the work, which proved the vast industry and talent of the author, and rendered his volumes infinitely valuable, whether his diagnostics were true or false, it seems probable that the discovery of Laennec, like that of Avenbrugger, might have been allowed to fall into temporary oblivion. As it was, however, the work soon excited a great sensation in Paris, and the new method of diagnosis was hailed, especially by the younger members of the profession, as a discovery fraught with the most splendid results. Fortunately, also, the whole of the author's investigations had taken place in the eye of the public, and before numerous and zealous pupils, both able and willing to prosecute the methods which they had seen productive of such wonderful effects in the hands of their master. These pupils, with a warmth natural to their years, soon spread the practice of auscultation not only in France, but conveyed it, in some degree, into every country of Europe.

Meanwhile the author had retired to his native province, worn down with bodily and mental disease. His retreat was a country-house of his own, near Quimper (named in the language of the country *Kerlouarnec*, the place of foxes,) on the shores of the bay of Douarnenez. His illness at this time presented none of the characters of that which subsequently terminated his life. According to the account transmitted to me by Dr. M. Laennec, it was a *slow nervous fever*, without any sign of severe local disease. The principal symptoms were—dyspnœa *with puerile respiration*, and without cough; dyspepsia and anorexia, but without redness of the tongue, nausea, vomiting, diarrhœa, or pain in the abdomen; a tendency to vertigo but without headache; great muscular debility with disposition to fainting, and lowness of spirits amounting almost to *tædium vitæ;* these two last symptoms were the most prominent, and the most distressing of all. The truly nervous character of Laennec's disorder, was sufficiently proved by the event of the case; as it was removed in a surprisingly short time by his residence in the country. The pure air of the sea-shore; the freedom from care and mental labour; exercise, particularly hunting, of which he was passionately fond, and the delightful associations of childhood and youth, re-awakened amid the very scenes which had given them birth, spread their enchantments over his wasted frame and spirits, and restored the energy of both. It is no wonder, therefore, that he was unwilling to return to Paris. He believed that he could not preserve his health there more than six months; and it was only the great regard he bore to his family, and the powerful influence of his religious principles, that had sufficient weight to make him leave his retreat. In returning to the metropolis, we are assured that he was solely influenced by the idea that he might be of use to mankind, by extending the knowledge of auscultation. M. Laennec reached Paris on the 15th November, 1821, and immediately resumed his duties in Necker Hospital. He likewise commenced a course of Clinical lectures, chiefly illustrative of his new discoveries, which were attended by many zealous students, and particularly by foreigners. Two months after his return to the capital, he was selected by M. Hallé (who retired on account of ill health) for his successor, as physician in ordinary to the Duchess of Berri; and on the death of this gentleman, in March following, he was also appointed, by royal authority, his successor in the Chair of Medicine in the College of France. This appointment took place on the last day of July, 1822; and the new professor delivered his first lecture on the 2nd of December in the same year.*

Owing to disturbances among the pupils, countenanced by some of the professors, and originating in causes of a political nature, the Faculty of Medicine was suppressed, by royal authority, in the beginning of November, 1822, and was re-established early in the succeeding February. M. Laennec, on this occasion, was nominated Professor of Clinical Medicine, and began his course of Lectures, at La Charité, on the 1st of April of the same year. A higher office had been offered to him, namely, that of Member of the Royal Council of Public Instruction; but he preferred the appointment which afforded him an opportunity of continuing his researches and extending the knowledge of his discoveries. "It was here (says M. Bayle) at *La Charité*, surrounded by his patients, that we had an opportunity of admiring, at once, the delight he took in the instruction of his pupils, the deep interest he had in the improvement of his art, and his courage in surmounting habitual sufferings in order to indulge in his favourite pursuits. His painful efforts were rewarded in a manner the most agreeable to him, by a numerous concourse of pupils, and even of distinguished physicians, whom his great reputation attracted to Paris from every country in Europe." "We saw him (says

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* This was afterwards published in the Archives Gén. de Méd. for Jan. 1823.

M. Kergaradec) in his new office, displaying the same zeal and the same exactness which distinguished the performance of all his duties. He showed the utmost courtesy and complaisance to all who were attracted to his clinic by his great name and the wish to perfect themselves in the use of the stethoscope. His auditors consisted of the natives of every country in civilized Europe, many of whom had come purposely to Paris, with the view of judging personally of the new method of exploration, and of seeing the illustrious individual who was entitled to the twofold honour of having discovered and brought it to perfection."

M. Laennec's assiduity in teaching, did not make him neglect the work on which the great reputation he now enjoyed was chiefly founded. The first edition of the *Treatise on Auscultation* had been for some time out of print; he, therefore, set about preparing a new one, with the utmost care. This was a work of great labour; as the alterations made in the second edition constitute it rather a new treatise, than an improved copy of the old. He not only altered the entire plan of the work, but he submitted all his facts to a new examination. He corrected some mis-statements, cleared up many doubtful passages, and perfected many points of investigation which had been only commenced at the time of his first publication; he likewise added the important subject of *treatment* to his previous account of the anatomy and diagnosis of the diseases. The new work having thus received the most careful, and, as it proved, the final revision of the author, appeared in the beginning of 1826. In like manner as at the time of the publication of the former edition, the physical powers of the author seem to have been completely exhausted by the exertions he made to finish his work, combined with the pressure of his other engagements of a public and private nature. Scarcely was his book published, when the disease under which he had been labouring for some time, increased with so much rapidity as soon forced him to relinquish all his employments. He had been long subject to a dry cough, to transient pains in his right side, and to a diarrhœa, which, when it kept within moderate bounds, he considered rather beneficial than otherwise. In the beginning of April, these symptoms became aggravated, with the addition of fever and dyspnœa and considerable emaciation. Bloodletting and other appropriate measures were had recourse to, only with very temporary benefit; and he resolved to make trial, once more, of the means from which he had, on a former occasion, derived such signal benefit. He reached his country residence, after a fatiguing journey, (which was rendered still more distressing by an accident from which he suffered a severe local injury,) and in circumstances very different from those attending his former return. The pleasure of once more finding himself in the place of his birth and of his affection, the freshness of the sea-air, in which he had the most remarkable confidence, the freedom from all professional cares and duties, and gentle airings in a carriage, seemed for a short space to reanimate both his exhausted spirits and his wasted frame. But the relief was brief and illusive; the bad symptoms all returned with redoubled force; and he died on the 13th of August, 1826, in the forty-fifth year of his age.

There can be no doubt that the disease of which Laennec died was *phthisis pulmonalis*; and it is somewhat curious that he shared the fate of some of his most illustrious predecessors, in falling a victim to a disease, the nature of which he had taken particular pains to illustrate.

Lancisi and Corvisart died of diseased heart: and his own friend Bayle sunk, like himself, under the ravages of the disease of which he had been the most successful illustrator, and of the inevitable fatality of which he had been the most strenuous assertor. M. Laennec's case presented all the external symptoms of consumption; and its nature was, moreover, fully confirmed by the very art which he had himself discovered. Before he left Paris, Drs. Recamier and Meriadec Laennec discovered *imperfect* but *evident pectoriloquy*, under the clavicle, and in the supra-spinal fossa of the left side; and at Quimper, Drs. Ambrose Laennec and Ollivry observed the same in the infra-spinal fossa. There can, therefore, be no question that tubercles, in a state of softening, existed in his lungs. Some time before his death, his medical attendants had likewise discovered a hard irregular tumour in the abdomen, the precise nature of which was never ascertained, as the body was not examined after death. This appears a rather singular omission, considering the eminence and character of the man, the period of his death, and the circumstances of his life. I am informed by his cousin, that the examination did not take place, because there was no medical person near him at the time of his decease.

M. Laennec was of diminutive size from birth, but not a sufferer from disease in the earlier parts of his life. He grew up small in stature, very thin, but of greater muscular powers than his figure promised.* During the latter years of his life, he was attenuated in a most remarkable degree, insomuch that it was matter of astonishment to every stranger that he could undergo the exertions which his duties required. In estimating the value of his labours, it is necessary to keep in view the state of his health; for if great results were produced under the constant pressure of disease, it is reasonable to suppose that his mind was capable of much greater efforts, if it had happily been united with a material fabric of greater vigour. M. Laennec was married only two years before his death, and had no children. His widow has received from Government a pension of 3000 francs per annum.†

M. Laennec was a man of the greatest probity, habitually observant of his religious and social duties. He was a sincere Christian, and a good Catholic, adhering to his religion and his church through good report and bad report. "His death (says M. Bayle) was that of a Christian. Supported by the hope of a better life, prepared by the constant practice of virtue, he saw his end approach with composure and resignation. His religious principles, imbibed with his earliest knowledge, were strengthened by the conviction of his maturer reason. He took no pains to conceal them when they were disadvantageous to his worldly interests; and he made no boast of them, when their avowal might have been a title to favour and advancement."

In the practice of his profession he was extremely liberal and disinterested. "His great reputation," says the author just quoted, "caused his services to be required by persons of the highest station, as well as by the poor: the former he frequently refused to visit, on account of the bad state of his health, the latter never. Nor was it only in the way of professional advice that he served the poor: he was extremely liberal in relieving their distresses with pecuniary aid, and in a manner so unostentatious, that it is only since his death that the extent of his bounty has come to light."

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* He was extremely fond of field sports, and took great delight in speaking of them. The exertions he was capable of making on these occasions, were remarkable, considering, as he said, "l'air chétif de son extérieur." For instance: he would walk eight or ten leagues, carrying his bag and gun; and on his return home, in place of resting himself, he would enter into some species of domestic amusement.

† During the four last years of his life M. Laennec practised only as a consulting physician. The following may be received as a fair approximation towards the amount of his income: from the Faculté de Médecine 10,000 francs; from the Collége de France 5,000; from the Duchess of Berri 4,000; from his private practice from 20 to 25,000.

M. Laennec was mild and agreeable in his manners, and of a quiet and even temper. His conversation was at once lively and instructive; and his natural humility and kindness of heart were in no degree lessened by his great reputation, and the deference that was paid to him in the after years of his life. He was remarkable for his great kindness and courtesy to foreigners, particularly the English. "The homage paid to the talents of Laennec," says Dr. Williams, "gives me a gratification that almost seems personal; and I doubt not that this feeling is shared by others of his pupils, in whom his urbane and amiable deportment created a sincere regard for the man, as his great mental abilities excited our respect. His great talents are known to the public through the medium of his writings; but those who attended his *clinique* can alone appreciate the wonderful acuteness of perception and faculty for observation, that enabled him to carry his discovery to the degree of perfection in which he left it; and they, above all, witnessed, felt, and profited by the solicitous interest which he showed, to make others partake of its inestimable advantages."* He was, however, less popular with many of his own countrymen, and especially with that numerous class of students and young practitioners who were disciples of the school of Broussais. With this physician M. Laennec was much at variance; and a controversy was for some time kept up between them, which redounded little to the credit of either. It must be admitted that M. Laennec was not free from prejudices: and he could never be brought to render full justice to the doctrines of his opponent. This is much to be regretted: for whatever be the errors of that system, there can be no doubt that to it the world is indebted for many valuable discoveries in pathology, and most important improvements in practical medicine. But, even if this were not the case, the system deserved, at least, at the hands of a philosopher, to be examined with calmness, and its good separated from its evil with candour. It is true that the opponents of M. Laennec in this controversy, were more violent, and more prejudiced than himself; and every one must admit, that to retain, amid the excitations of controversy, the golden mean of truth and justice, both in the appreciation of the facts adduced by our adversary, and in the expression of our arguments, is only permitted to few. If M. Laennec was not of this number, it ought certainly to be matter of regret, but not of surprise.

M. Laennec was strongly attached to the existing government of France; and was a decided enemy to the liberal opinions in politics, which characterized the popular party in that country. He is even reproached, I know not how justly, with permitting his prejudices, in this particular, to interfere with his judgments as a man of science and a professor. I hope this is not true.

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* A Rational Exposition of the physical signs of the diseases of the lungs and pleura. Preface to the first edition, p. ix. I gladly avail myself of this opportunity of strongly recommending this very valuable work, of which a second edition is now published, to the notice of the student of auscultation.

It is unnecessary, after what has been already stated in this sketch, to dwell long upon the character of M. Laennec as a pathologist and medical writer. His whole life was devoted to professional pursuits; and his numerous writings afford irrefragable proof of great talent, and still greater industry. His genius was decidedly inventive, and his turn of thought original. His writings are generally marked by sound sense, clear views, and perspicuous order; they are, however, often diffuse, and sometimes needlessly minute. He was an excellent Greek and Latin scholar, and well read in the best medical authors, who have written in those languages. He was, however, by no means equally well acquainted with modern medical literature; and it must be admitted that his more important writings are deficient in references both to his predecessors and contemporaries. This may be partly accounted for by his impaired health, and partly by his devoting almost all his time, during his latter years, to the perfection of his great discovery. He was particularly fond of the Latin language, and, in different parts of his writings, regrets that it is not still made the general medium of intercourse between men of science. He was accustomed, in the clinical hospital, to dictate his reports, and to address the pupils in that language; partly from a wish to conceal from the patients his opinions of their complaints, and partly from his having always among his followers a good many foreigners who might, perhaps be unacquainted with the French. He himself, I believe, could speak or read no modern language but his own. On this account he was sometimes in the habit of corresponding in Latin.*

However eminent as a pathologist, however qualified for accurate observation, and however gifted with inventive genius, it is the opinion of many who had opportunities of personal observation, that M. Laennec did not possess, in a high degree, the mental qualifications necessary to constitute a great and skilful practitioner. Even in the very class of diseases, in the knowledge of whose pathology and signs he was without a rival, his practice was not reckoned of that scientific and comprehensive kind, which bespeaks a mind accustomed to take in at once the whole of the morbid processes, and quick and fertile in expedients to control or relieve them. This I think is evident from his own work, the therapeutical parts of which are not equal to the others. The inventive turn of his genius seemed to have frequently misled him from the most obvious and best path, because it was the common one; and in his search after novelty, he would sometimes adopt measures of very doubtful powers, and altogether overlook others of known and approved efficacy. In his total rejection of the doctrines of Broussais, he certainly committed a great practical error; and it may be stated generally that he was too much disposed to sacrifice scientific views to empiricism.

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* I give the following extracts from one of his letters to myself, as a specimen of his style. They are likewise in place here; the first as relating to the alterations in the second edition of his work: and the last as illustrating his taste for antiquarian lore.

Novam interea *Auscultationis intermediæ* editionem molior, quam, vergente anno, publici juris faciam, statimque ac in lucem prodibit, ad te exemplarium mittam. Non nulla in eà nova erunt, multa clariora aut certiora. Morborum præterea pectoris curandorum rationes, usu et experientià magis comprobatas addo. Operis eâ de causâ, ordo haud parum diversus, nec tamen moles multo amplior erit: nam non nulla delere aut saltem contrahere in animo est. Ideo te non nisi postquam opus acceperis, ad novam versionis tuæ editionem faciendam, accingendum esse arbitror; tantum historias ægrotorum, quas in primà versione breviter indicâsti, fusè vertere potes, nam de his parum demam, nisi quoad stylum forsan attinet......

P. S. Signatâ jam epistolâ, titulum tuæ versionis relegi, et video te Societati Geologicæ Cornubiensi, à scriptis esse aut fuisse. Si fortè opusculum aliquod antiquâ linguâ Cornubiensi scriptum, aut quod ejusdem linguæ notitiam aliquam contineret, mihi indicare posses, hoc sane me incredibili gaudio perfunderet: nam Armorico-Britannus sum, vernaculæque linguæ, id est Celticæ, ut qui maximè cupidus; inter cujus dialectos, Cornubiensis etiamsi abhinc 80 annos aut circiter penitus obsoleverit, tamen philologiæ Celticæ semper pretiosa erit, quia nexum et transitum efficit inter Armoricanas dialectos et Cambricas (Vestrates dicunt, ni fallor *Welsh language*). Cambrica scripta majoris momenti fere omnia habeo; sed nihil unquam de Cornubiensi linguâ novi, præter *Lloydi Archæologiam Britannicam*, eximium opus, sed rarissimum, quodque semel duntaxat, in bibliothecâ cujusdam docti viri, videre potius quam legere licuit. Si vulgariora quædam populi Cornubiensis, nuper elapso sæculo prorsus extincti, monumenta adhuc supersunt, ut puta, cantilenæ populares, aut Christianarum precum libelli, gratissimum mihi faceres, si posses aliquid ejusmodi ad me mittere ......

It will not for a moment be supposed that the kind of study to which M. Laennec was more particularly devoted, could have any effect in producing this result. On the contrary, it is a thing of daily observation that men, in every other respect most highly qualified by natural gifts, and by general education, for becoming good practitioners, are rendered the very reverse by their mere ignorance of pathology; while it is equally common to find others, most deficient in the natural qualifications, who pass for good practitioners, on the single ground of their pathological knowledge. It is only where the peculiar but indefinite talent for the *art* of practical medicine, is combined with a talent for close observation, and a profound knowledge of pathology, that we find the physician arrive at the greatest degree of perfection in his practice.

The most remarkable features in the character of Laennec, as a practical physician, were his profound acquaintance with organic diseases, and his accurate diagnosis of them in the living body. His examinations were most extensive and minute; and the judgments he founded on these, were such as might be expected from his industry and his talents. In the diagnosis of the diseases of the chest, he was universally allowed to be without a rival; and it is but justice to state, that whatever was his zeal for his new diagnostic measures, he seemed always more desirous of ascertaining the truth, whatever this might be, than to obtain results that might redound to the honour of his discovery.

M. Laennec had a great taste for mechanical knowledge; and to this bias of his mind we are probably indebted for the invention of the stethoscope. He was also conversant with practical mechanics, and used to make his own stethoscopes.

In the preceding pages I have already named the principal published writings of M. Laennec; and shall now subjoin in a note, a list of the few that remain unnoticed,* excepting his *Reviews*. These latter productions are very numerous and are contained principally in the Journ. de Méd. from 1804 to 1814. Many of them were written when the author was still very young, and evince considerable talent. Among these, an article on the system of John Brown, (Op. Cit. t. xi.,) and another on the doctrines of Gall, (Ibid. t. xii.,) both written in his 25th year, are excellent in their kind. The following brief character of Brown and his work is truly drawn and forcibly expressed. "L' ensemble même de l'ouvrage, quoique souvent mal coordonné, mal lié dans ses parties, porte cependant partout l'empreinte d'un esprit peu ordinaire. Il faut du génie pour s'égarer, ainsi que l'a fait *Brown:* mais dans les sciences d'observation, le génie n'est qu'un don funeste de la nature, lorsqu'il n'est pas accompagné d'un esprit droit et juste. Si au lieu de se livrer à son imagination, *Brown* eût puisé dans les ouvrages des maîtres de l'art une instruction solide, s'il eût consulté la nature au lieu de raisonner sur ses lois, il eût rendu ses talens aussi utiles aux progrés de la médecine, qu'ils peuvent lui devenir funestes par l'usage qu'il en fait."* The article on Gall, which may fairly bear comparison with the celebrated one by Dr. Gordon in the 25th vol. of the Edinburgh Review, and which it preceded by no less than nine years, is forcibly and pleasantly written; but, like Dr. Gordon's, it was conceived in a spirit unbecoming the philosophic inquirer after truth, and composed in evident ignorance of the principles of the doctrines which it professes to expound.† Laennec was a true *Breton*, fond of his country and consequently jealous of its honour. It is amusing to observe in one of his reviews (*Journ. de Méd.* t. xi. p. 642) the high tone he assumes in refuting a charge, brought by a certain writer against his native country, for being infamous for an epidemic itch. He solemnly assures us that if, in very truth, "*la gale s'observe quelquefois en Bretagne,* on en doit moins accuser les localités, que le passage et le séjour des matelots," &c.

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* Observation sur un Suicide, *Journ. de Méd.* t. v.
Observation sur une Maladie du Cœur, *Ibid.* t. vii.
Réflexions sur l'Hydrocéphale interne aigu, *Ibid.* t. xi.
Observation sur un Aneurisme de l'Aorte, *Ibid.* t. xii.
Fièvres intermittentes pernicieuses survenues dans la convalescence d' autres maladies, *Ibid.* t. xiv.
Observation sur une affection aptheuse, *Ibid.* t. xxii.

A good deal has been said respecting the manuscript writings left by Laennec, and one of his biographers has led the public to expect the early publication of a considerable part of them by his cousin, Dr. Meriadec Laennec, to whom they were bequeathed. This is a mistake. The following is an account of them transmitted to me by Dr. M. Laennec. 1st. a very great number of Cases, indeed the whole drawn up by the author during the course of his medical life. They are quite unfit for

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Observation sur des vers ascarides, &c. *Bulletins de la Soc. de l' Ecole de Méd.* t. i. p. 53.

Mémoire sur les vers versiculaires, Ibid. p. 121.
Seance du 6 thermidor an. xiii. Mémoire sur le Cysticerque à double vessie.
—— du 51 frimaire an. xiv. Note sur la non-existence du *tænia visceralis.*
—— du...... an. xiv. Note sur une dilatation partielle de la valvule mitrale.
—— du 16 Avril 1807. Mémoire sur une nouvelle espèce d' hernie (Intrapelvienne.)
—— du 19 Décembre 1810. De angina pectoris commentarius.

[*] Journ. de Méd. t. xi. p. 230.

[†] While combating his author on the score of the number and division of his faculties, the reviewer asks why there is not one for *dancing* as well as for *painting, music,* &c. and pleasantly adds, that the doctor might have high authority for the new organ. The first Vestris, he informs us, having just finished a dance which seemed to require as much strength as agility, was asked by a spectator if he was not much fatigued—"Monsieur," said the dancer, "dans notre art la fatigue des jambes est peu de chose; c'est ceci," he added, pointing to his forehead—"c'est ceci qui travaille!"—*Journ. de Méd.* t. xii. p. 285.

publication. The greater number of them present facts now well known, and such as possess peculiar interest or novelty, have been already made use of by the author himself, in his published writings. 2nd. Some chapters on *Accidental Productions*, partly published in the *Dict. des Sc. Méd.* and in his *Treatise on Auscultation*. 3rd. A collection of notes on the whole subject of medicine, from which he delivered his lectures at the *Collège de France*. These notes are in general very short, and very unconnected, and could only be reduced to a connected form by much labour, and by some one who had heard the discourses and was acquainted with the lecturer's method. Dr. M. Laennec says it is his intention to attempt this, for the first thirty lectures; and if he succeeds so far as to produce a work not unworthy the memory of the author, he will publish it; but not otherwise. In this task Dr. M. Laennec's labour will be somewhat analogous to my own, but still more difficult. I have had only to express in new language ideas already expressed: he will have to call up from the stores of his own memory, or supply from his own judgment, all that is necessary to convert the fragments in his hands into a connected whole: both of us, probably, may consider it the dearest labour of our lives, and our highest honour, that we have been instrumental in spreading among the members of our common profession throughout the world, the knowledge of the great discovery that will render the name of LAENNEC immortal.

J. F.

NOTIÇE TO BINDER.

Plate II. . . . . *to face the Title.*

ANALYTICAL TABLE OF CONTENTS.

PAGE
DEDICATION v
TRANSLATOR'S PREFACE TO THE SECOND EDITION . vii
———— TO THE THIRD EDITION . . xiii
———— TO THE FOURTH EDITION . . xv
LIFE OF THE AUTHOR . . . xvii

INTRODUCTION 1

PART FIRST.

OF THE EXPLORATION OF THE CHEST 9
Chap. I. OF THE MORE ANCIENT METHODS . . ib.
  Sect. 1. *Manual examination of the chest* . . ib.
  Sect. 2. *Inspection of the chest* . . . 12
  Sect. 3. *Succussion of the chest* . . 14
  Sect. 4. *Abdominal pressure* . . . 15
Chap. II. OF PERCUSSION. 16
  Mode of percussion . . . 17
  Character of the sound in different parts . 19
Chap. III. OF IMMEDIATE AUSCULTATION . . 24
Chap. IV. OF MEDIATE AUSCULTATION . . 27
  Sect. 1. *Auscultation of the respiration* . . 28
    Vesicular respiration . . . 29
    Bronchial respiration . . . 33
    Cavernous respiration . . . 34
    Blowing or puffing respiration . . ib.
  Sect. 2. *Auscultation of the voice* . . . 35
    Bronchophony . . . 37
    Pectoriloquy 38
    Ægophony 39
  Sect. 3. *Auscultation of the cough* . . . 47
  Sect. 4. *Auscultation of other sounds* . . 48
    Different kinds of rhonchus . . . ib.
    The moist crepitous rhonchus . . 49
    The mucous rhonchus . . 50
    The tracheal rhonchus . . 51
    The dry sonorous rhonchus . . . 53
    The dry sibilous rhonchus . . 54
    Dry crepitous rhonchus . . . ib.
    Of the metallic tinkling . . 56

PART SECOND.

DISEASES OF THE BRONCHI, LUNGS, AND PLEURA.

BOOK FIRST.

DISEASES OF THE BRONCHI.

PAGE
Chap. I. OF THE CATARRHAL AND INFLAMMATORY AFFECTIONS OF THE MUCOUS MEMBRANE 61
Sect. 1. *Of the acute mucous catarrh* . . ib.
Anatomical characters . . . 62
Symptoms and progress . . . 64
Occasional causes . . . 65
Pathognomonic signs . . ib.
Treatment 67
Sect. 2. *Of the Chronic mucous catarrh* . . 70
Symptoms and progress . . . 71
Treatment 72
Sect. 3. *Of the Pituitous catarrh* . . 76
Idiopathic pituitous catarrh . . . ib.
Acute pituitous catarrh . . . 77
Chronic pituitous catarrh . . 78
Treatment 79
Sect. 4. *Of the suffocative catarrh* . . . 80
In old persons . . . ib.
With œdema of the lungs . . ib.
In the dying 81
In adults and children . . . ib.
Treatment . . . ib.
Sect. 5. *Of the dry and latent catarrh* . . 83
Symptoms and progress . . 85
Treatment 87
Sect. 6. *Of the hooping cough* . . . 91
Treatment 93
Sect. 7. *Of symptomatic catarrh* . . 95
Chap. II. OF DILATATION OF THE BRONCHI . . 100
Anatomical characters . . ib.
Occasional causes . . . 102
Signs and symptoms . . . ib.
Treatment 104
CASE I. . . . 105
CASE II. . . . 106
CASE III. . . . 107
CASE IV. . . . 108

PAGE
Chap. III. Of Croup 112
Anatomical characters . . . 113
Symptoms 116
Occasional causes . . . 119
Treatment 120
Chap. IV. Of bronchial Hæmorrhage . . . 123
Anatomical characters . . 124
Signs and symptoms . . . ib.
Occasional causes . . . 125
Treatment . . . ib.
Chap. V. Of Polypus of the bronchial membrane . 126
Chap. VI. Of Ulcers of the bronchi . . 128
Anatomical characters . . . ib.
Symptoms 129
Treatment 130
Chap. VII. Of alterations of the bronchial coats . ib.
Chap. VIII. Of foreign bodies in the bronchi . 131
Chap. IX. Of diseases of the bronchial glands . 133

BOOK SECOND.

DISEASES OF THE LUNGS.

Structure of the lungs . . . 135
Chap. I. Of hypertrophy of the lungs . . 139
Chap. II. Of atrophy of the lungs . . 140
Chap. III. Of emphysema of the lungs . . 141
Sect. 1. *Of Vesicular emphysema* . . ib.
Anatomical characters . . . ib.
Occasional causes . . . 147
Signs and symptoms . . . 148
Progress of the disease . . . 150
Treatment 152
Case V. . . . ib.
Case VI. . . . 153
Case VII. . . . 154
Case VIII. . . 155
Sect. 2. *Of Interlobular emphysema* . . 157
Anatomical characters . . . 158
Occasional causes . . . 159
Signs 160
Treatment 161
Chap. IV. Of Œdema of the lungs . . 163
Anatomical characters . . . 164
Symptoms and signs . . . ib.
Case IX. . . . 166
Case X. . . . 167
Case XI. . . . 168
Case XII. . . 169

PAGE
Chap. V. OF PULMONARY APOPLEXY . . 171
Anatomical characters . . . ib.
Signs and symptoms . . . 174
Occasional causes . . . 179
Treatment 180

Chap. VI. OF PNEUMONIA . . . 182
Sect. 1. *Anatomical characters of the acute* . . 183
First degree (engorgement) . . ib.
Second degree (hepatization) . . ib.
Third degree (purulent infiltration) . 185
Abscess of the lungs . . 188
Resolution of pneumonia . . 191
Duration of the disease . . . 192
State of the bronchi . . . 193

Sect. 2. *Signs and symptoms of Pneumonia* . ib.
Physical signs . . . 194
Signs of suppuration . . . 197
Signs of abscess . . . ib.
Signs of resolution . . . 198
Pulmonary symptoms . . . 201
General symptoms and progress . . 203
Occasional causes . . . 205

Sect. 3. *Of gangrene of the lungs* . . . 207
Uncircumscribed gangrene . . ib
Circumscribed gangrene . . 208
Anatomical characters . . . ib.
Physical signs . . . 209
Symptoms and progress . . . 211
CASE XII. (*bis*) . . ib.
CASE XIII. . . . 212
CASE XIV. . . . 213
CASE XV. . . . ib.

Sect. 4. *Of Chronic Pneumonia* . . . 216
Sect. 5. *Of latent and symptomatic Pneumonia* . 218
Sect. 6. *Treatment of Pneumonia* . . . 221
Bloodletting . . . 222
Derivatives 226
Alkalis and Attenuants . . ib.
Purgatives and Emetics . . . 227
Tonics . . . 228
Alteratives 229
Tartar emetic in large doses . . 230
Regimen 247
CASE XVI. . . . 248

Chap. VII. OF PHTHISIS PULMONALIS . . 252
Sect. 1. *Anatomical history of tubercles* . . 253
Miliary tubercles . . . ib.
Granular tubercles . . . 254

PAGE
Grey tuberculous infiltration . . 256
Jelly-like infiltration . . . ib.
Encysted tubercles . . . 262
Organic changes accompanying phthisis . 267
Sect. 2. *Do tubercles arise from Inflammation?* . 271
From acute pneumonia? . . ib.
From Chronic pneumonia? . . 273
From catarrh? 274
From pleurisy . . . 276
Sect. 3. *Is phthisis curable?* . . . 279
Case XVII. . . 281
Case XVIII. . . 282
Case XIX. . . . 283
Case XX. . . 284
Case XXI. . . . 285
Case XXII. . . 289
Case XXIII. . . 291
Case XXIV. . . . 294
Case XXV. . . 296
Case XXVI. . . 298
Sect. 4. *Occasional causes of phthisis* . . . 299
Sect. 5. *Physical signs of tubercles* . . 308
Signs of crude tubercles . . . ib.
Signs of the softening of tubercles . . ib.
Signs of the discharge of tubercles . . 309
Case XXVII. . . 314
Case XXVIII. . . 316
Case XXIX. . . . ib.
Sect. 6. *Symptoms and progress of phthisis* . 317
Regular manifest phthisis . . ib.
Vomica of the lungs . . . 323
Irregular manifest phthisis . . 325
Latent phthisis . . . 327
Acute phthisis . . . 328
Chronic phthisis . . 329
Sect. 7. *Treatment of phthisis* . . . ib.
Means of softening tubercles . . 332
Empirical means . . . 334
Palliative treatment of symptoms . . 338
Chap. VIII. Of cysts in the lungs . . 342
Chap. IX. Of hydatids in the lungs . . 343
Treatment 346
Chap. X. Of concretions in the lungs . . 347
Chap. XI. Of melanosis of the lungs . . 351
Encysted melanosis . . . 352
Unencysted melanosis . . . 353
Diffused melanosis . . . ib.
Case XXX. . . . 359
Case XXXI. . . ib.

PAGE
Chap. XII. OF ENCEPHALOID TUMOUR OF THE LUNGS . 362
  Encysted medullary tumour . . . 364
  Unencysted medullary tumour . . 365
  Diffused medullary tumour . . 366
Chap. XIII. OF DISEASES OF THE PULMONARY VESSELS . 367
Chap. XIV. OF NERVOUS AFFECTIONS OF THE LUNGS . 369
  Sect. 1. *Neuralgia of the lungs* . . . ib.
  Sect. 2. *Nervous Dyspnœa* . . . 371
    i. *Asthma with puerile respiration* . . 373
    ii. *Spasmodic asthma* . . . 374
  Treatment 382

BOOK THIRD.

DISEASES OF THE PLEURA.

Chap. I. OF PLEURISY 392
  Sect. I. *Of simple acute pleurisy* . . 393
  Sect. 2. *Of acute hæmorrhagic pleurisy* . . 401
  Sect. 3. *Of gangrene of the pleura* . 405
  Sect. 4. *Signs and symptoms of acute pleurisy* . 406
    Physical signs . . . . ib.
    Double pleurisy . . . 412
    Local symptoms . . . ib.
    General symptoms 414
  Sect. 5. *Of chronic pleurisy* . . . 415
    Anatomical characters . . ib.
    Signs and symptoms . . . 417
  Sect. 6. *Of contraction of the chest* . . 419
      CASE XXXI. (*bis.*) . . 423
      CASE XXXII. . . 424
      CASE XXXIII. . . . 426
      CASE XXXIV. . . 429
  Sect. 7. *Of circumscribed or partial pleurisy* . 431
    Signs and symptoms . . . 433
  Sect. 8. *Of latent pleurisy* . . . 434
  Sect. 9. *Treatment of pleurisy* . . . 435
    Operation of empyema . . 439
  Sect. 10. *Of Pleuro-pneumonia* . . . 443
    Pneumonia with slight pleurisy . . ib.
    Pleurisy with slight pneumonia . . 445
    True pleuro-pneumonia . . . 446
Chap. II. OF HYDROTHORAX . . . 448
  Sect. I. *Of idiopathic hydrothorax* . . 449
    Signs and symptoms . . ib.
  Sect. 2. *Of symptomatic hydrothorax* . . 451
Chap. III. OF HÆMATHORAX . . . 454
  Treatment . . . 455

PAGE

Chap. IV. OF PNEUMOTHORAX . 456
Sect. 1. *Anatomical characters of pneumothorax* ib.
CASE XXXV. . . 460
Sect. 2. *Symptoms and signs of pneumothorax* . 461
CASE XXXVI. . . 464
Sect. 3. *Of pneumothorax with liquid effusion* . 465
CASE XXXVII. . . . 470
CASE XXXVIII. . . 472
CASE XXXIX. . . . 474
CASE XL . . . 475
CASE XLI. . . . 476
Sect. 4. *Of the metallic tinkling as a sign* . . 479
CASE XLII. . . 482
Treatment of pneumothorax . . 485
CASE XLIII. . . . 486
Sect. 5. *Of double pneumothorax* . . . 487
Chap. V. OF ACCIDENTAL PRODUCTIONS IN THE PLEURA . 488
Sect. 1. *Productions with effusion* . . ib.
Sect. 2. *Solid productions* . . . 490
CASE XLIV. . . ib.
Sect. 3. *Productions on the outer surface* . . 492
Sect. 4. *Diaphragmatic hernia* . . . ib.

PART THIRD.

DISEASES OF THE HEART AND ITS APPENDAGES.

BOOK FIRST.

OF THE EXPLORATION OF THE ORGANS OF CIRCULATION.

GENERAL REMARKS 494
Chap. I. OF THE EXTENT OF THE HEART'S PULSATIONS . 496
Chap. II. OF THE SHOCK OR IMPULSE . . . 500
Chap. III. OF THE SOUND . . . 502
Chap. IV. OF THE RYTHM . . . 504
Chap. V. OF ANOMALOUS SOUNDS . . . 516
Sect. 1. *Of the bellows-sound* . . ib.
Proper bellows-sound . . . 517
Sound of the saw . . . ib.
Musical bellows-sound . . . ib.
Causes of the bellows-sound . . 518
Sect. 2. *Of the purring-thrill* . . . 523
Sect. 3. *Of the sound of pulsation at a distance* . 526
Chap. VI. OF PALPITATION OF THE HEART . . 527
Chap. VII. OF IRREGULARITIES OF THE HEART'S ACTION . 529
Chap. VIII. OF INTERMISSIONS OF THE HEART'S ACTION . 530

BOOK SECOND.

OF DISEASES OF THE HEART.

PAGE

Chap. I. OF DISEASES OF THE HEART IN GENERAL . 536
Sect. 1. *Of the symptoms of all diseases of the heart* . ib.
Sect. 2. *Of the changes produced on other organs* . 539
Sect. 3. *Of the causes of diseases of the heart* . 542

Chap. II. OF HYPERTROPHY OF THE HEART . . 544
Signs of hypertrophy of the left ventricle . 547
right ventricle . 549

Chap. III. OF DILATATION OF THE VENTRICLES . . 551
Anatomical characters . . . ib.
Signs of dilatation of the left ventricle . 553
right ventricle . ib.

Chap. IV. OF DILATATION WITH HYP. OF THE VENTRICLES . 555
Signs 556
Chap. V. OF DILAT. OF ONE VENT. WITH HYP. OF THE OTHER . 557
Chap. VI. OF DILATATION WITH HYPERT. OF THE AURICLES 560
Chap. VII. OF PARTIAL DILATATION OF THE HEART . 562
Chap. VIII. OF INDURATION OF THE HEART . . 564
Chap. IX. OF SOFTENING OF THE HEART . . 565
Chap. X. OF ATROPHY OF THE HEART . . 570
Chap. XI. OF DISPLACEMENT OF THE HEART . . 571
Chap. XII. OF MALFORMATION OF THE HEART . . 573
Chap. XIII. OF CARDITIS . . . 576
Chap. XIV. OF RUPTURE OF THE HEART . . 579
Chap. XV. OF FATTY DISEASE OF THE HEART . . 583
Chap. XVI. OF OSSIFICATION OF THE HEART . . 584
Chap. XVII. OF ACCIDENTAL GROWTHS IN THE HEART . 586
Chap. XVIII. OF OSSIFICATION OF THE VALVES . 588
Sect. 1. *Anatomical characters* . . . ib.
Sect. 2. *Signs* 591
CASE XLV. . . . 594
Sect. 3. *Ossification of the internal membrane of the heart* 598

Chap. XIX. OF POLYPI OF THE HEART . . 599
Chap. XX. OF INFLAMMATION OF THE INTERNAL MEMBRANE 603
Redness . . . . . ib.
Pseudo-membranous exudation . . 606
Ulceration . . . 607
Polypous concretions . . . 608

Chap. XXI. OF EXCRESCENCES ON THE VALVES, &c. . 611
CASE XLVI. 613
CASE XLVII. . . 614
CASE XLVIII. . . . 617
CASE XLIX. . . 619

Chap. XXII. OF PERICARDITIS . . . 620
Sect. 1. *Anatomical characters* . . . ib.
Sect. 2. *Signs* 623

PAGE
Chap. XXIII. OF HYDROPERICARDIUM . . 628
Signs 629
Chap. XXIV. OF PNEUMOPERICARDIUM . . 630
Chap. XXV. OF ACCIDENTAL PRODUCT. IN THE PERICARD. . 631
CASE L. . . . 631
Chap XXVI. OF ORGANIC AFFECTIONS OF THE VESSELS . 632
The coronary vessels . . . ib.
The pulmonary artery . . . 633
The pulmonary veins . . . 634
Chap. XXVII. OF THE ORGANIC DISEASES OF THE AORTA . ib.
Sect 1. *Ossification of the aorta* . . ib.
Sect. 2. *Malformation of the aorta* . . 635
Sect. 3. *Aneurism of the aorta* . . . 636
Anatomical characters . . . ib.
Signs 638
Chap. XXVIII. OF THE TREATMENT OF DISEASES OF THE HEART 641
Chap. XXIX. OF NERVOUS AFFECTIONS OF THE HEART, &c. . 648
Sect. 1. *Neuralgia of the heart* . . . ib.
Angina pectoris . . . 649
Treatment 652
Sect. 2. *Palpitation of the heart* . . . 655
Sect. 3. *Spasm of the heart* . . . 657
Sect. 4. *Nervous affections of the arteries* . . 658
Neuralgia . . . . ib.
Preternatural pulsation . . . ib.
Spasm, with bellows-sound . . 659
Treatment 660

APPENDIX.

OF THE APPLICATION OF AUSCULTATION TO OTHER CASES BESIDES DISEASES OF THE CHEST . . 663
Sect. 1. *Of the diagnosis of pregnancy* . . ib.
Sect. 2. *Of the diagnosis of other diseases* . . 667
1. *Fractures* . . . . ib.
2. *Urinary calculi* . . . 668
3. *Abscess of the liver* . . . 669
4. *Diseases of the tympanum, &c.* . . ib.
5. *Diseases of animals* . . . 670
EXPLANATION OF THE PLATES 673

CONTENTS OF THE PRINCIPAL NOTES.*

PAGE

AUSCULTATION *prophesied* by Hooke and indicated by Double before the publication of Laennec's Treatise . . 4
Different forms of the Stethoscope . . . 7
Utility of Manual Examination of the Chest . . 11
Value and mode of using mensuration of the Chest . . . 12
Value of Inspection as a means of Diagnosis . . . 14
Capacity of the lungs to contain air, as a test of their soundness . 15
Biographical notice of Avenbrugger . . . 16
Of covering and exposing the chest during percussion . . 17
Of the regional subdivision of the surface of the chest . . 21
Of mediate percussion 23
Relative value of mediate and immediate auscultation . . 27
M. Reynaud on ægophony (*M. L.*) 42
Dr. Williams on the cause of ægophony . . . 44
Reasons for using the word *rhonchus* for *râle* . . 48
The translator's classification of the different kinds of rhonchus . 49
Of the nature and cause of the crepitous rhonchus . . 50
Of the cavernous rhonchus 52
Of the sound of friction (*M. L.*) 58
Of the treatment of catarrh 69
Of the employment of fumigations and balsams in catarrh . 73
Of the use of chlorine gas in catarrh (*M. L.*) . . . 74
Of the use of colchicum and galvanism in catarrh . . 75
Of the author's classification of bronchial diseases and of the suffocative catarrh 82
Of the dry catarrh as the cause of asthma, and of the prevention and treatment of the latter 89
Opinions of authors respecting the seat and nature of hooping cough 93
Of the treatment of hooping cough 94
Literature of hooping cough . . . 95
Of the state of the mucous membranes in fever . . 98
Literature of catarrh and bronchitis . . . 99
Andral and Williams on the nature and cause of dilatation of the bronchi 102
Of the knowledge of croup by the ancients . . . 112
Of the relation of croup to cynanche maligna . 115
Of the discrimination of true and false croup (*M. L.*, & *Tr.*) . 118
Dr. Cheyne on blood-letting in croup . . . 120

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* The notes to which the letters M. L. are appended, are either wholly or in part by Dr. Meriadec Laennec; all the others are by the Translator.

PAGE
Of local applications to the air passages in croup (*M. L.*) 121
Of the use of calomel in croup 122
Literature of croup ib.
Of the bronchial polypus 127
Louis and Hastings on ulcers in the bronchi 128
Of ulcerations of the larynx and trachea 130
Morbific effects of the inhalation of dust 132
Andral and Piedagnel's opinions on empyema (*M. L.*) 145
Cause of the dry crepitous rhonchus (*M. L.*) 150
On pulmonary empyema in hares, hawks, &c. Opinions of Sir J. Floyer, &c. 151
Sir John Floyer's proposal for curing broken wind 152
Frequency of vesicular emphysema 157
Of the *sound of friction* as a sign of emphysema (*M. L.*) 162
Literature of emphysema of the lungs 162
Treatment of œdema of the lungs (*M. L., & Tr.*) 170
Analogy of pulmonary and cerebral apoplexy (*M. L.*) 172
Of the terminations of pulmonary apoplexy (*M. L.*) 174
Of the history, nature, and causes of pulmonary apoplexy 176
M. Rousset's sign of the complication of pulmonary apoplexy with pneumonia (*M. L.*) 178, 179
Drs. Clark and Broussais on certain effects of blood-letting 180
Literature of pulmonary apoplexy 182
Of the cause and nature of the granular appearance of the lungs in pneumonia 184
Of the impression of the ribs on inflamed lungs 185
Andral's idea of a vesicular pneumonia (*M. L.*) 186
Of the relative frequency of inflammation in the upper and lower lobes of the lungs 187
Of the relative frequency of inflammation in the right and left lungs ib.
Rareness of pulmonary abscess 189
Rareness of pulmonary abscess (*M. L.*) 190
Andral and Williams on the crepitous rhonchus 194
Of the value of the crepitous rhonchus as a sign in pneumonia 195
On the difficulty of detecting central pneumonia 200
On certain forms of expectoration in pneumonia, and on the importance of observing this in general 203
Influence of the season in producing pneumonia 205
Relation of pneumonia to the age of the subjects 206
Of chronic pneumonia—its rareness 217
Of pneumonia in phthisis 220
Of pneumonia from absorption of pus 221
Of bloodletting in the early stages of pneumonia 222
Of bloodletting in the later stages of pneumonia 223
Of local bloodletting in pneumonia 224
Of blisters in pneumonia (*M. L., & Tr.*) 226
Of the alkaline treatment of pneumonia 227
Of the use of purgatives in pneumonia 228
Of the use of calomel and opium in pneumonia 229
Of Dr. A. Laennec's experience of tartar emetic (*M. L.*) 237
Impropriety of emetics in pneumonia complicated with gastric irritation 242

PAGE
Of the treatment of pneumonia with tartar emetic in large doses . 244
Of low diet in pneumonia . . . 247
Literature of pneumonia 251
Of the similarity of granulations and tubercles . . 254
Of the nature and origin of tubercles (*M. L.*) . . 257
Dr. Carswell's opinions respecting tubercle . . . 259
Identity of grey granulations and yellow tubercles (*M. L.*) . 263
Relative frequency of tubercles in the two lungs . . 264
Relative frequency of tubercles in other organs (*M. L.*) . 266
Proportional frequency of intestinal ulcers in phthisis . . 268
State of the mucous membranes in phthisis (*M. L.*) . . 269
Proportional frequency in phthisical subjects, of organic affections in other organs besides the lungs . . . 269
Of the secretion of tubercles in the air-cells (*M. L.*) . . 276
Of catarrh, &c. considered as the cause of tubercles in the lungs . 277
Different opinions of the origin and nature of tubercles . 278
Of cicatrices in the lungs . . . 289
Of the geographical prevalence of phthisis . . 299, 300, 301
Relation of hæmoptysis to pulmonary tubercles (*M. L.*, & *Tr.*) . 302
Of the depressing passions as a cause of phthisis . . 303
Of the contagion of phthisis . . . 304
Relation of phthisis to the age of the individual (*M. L.*, & *Tr.*) 306
Relation of phthisis to sex 307
Of the state of the respiration in the early stage of phthisis . 313
Of perforation of the lungs in phthisis . . . 214
Actual value of auscultation as a means of diagnosis in phthisis . 317
Of pleuritic pains in phthisis 320
Of the expectoration in phthisis . . . 323
Of diarrhœa in phthisis 326
Of latent phthisis : . . . 328
Of the progress and duration of phthisis . . . 329
Of bloodletting in phthisis . . . 331
Of issues in phthisis 332
Of iodine in phthisis 333
Of the use of chlorine gas in phthisis (*M. L.*, & *Tr.*) . . 334
Of hydrocyanic acid in phthisis . . . 335
Of change of climate in phthisis . . . ib.
Importance of prophylactic treatment in phthisis . . 339
Literature of phthisis pulmonalis . . . 339
Dr. Carswell on the progress of melanosis . . 352
On the variety of melanosis termed liquid (*M. L.*, & *Tr.*) . 353
Chemical analysis of the matter of melanosis (*M. L.*, & *Tr.*) . 355
Relation of the matter of melanosis to the black pulmonary matter and the colouring matter of blood (*M. L.*, & *Tr.*) . 356
Chemical analysis of the black pulmonary matter . . 357
Dr. Carswell's classification of melanosis . . . 358
Literature of Melanosis . . . 362
Opinions respecting encephaloid cancer (*M. L.*) . . 366
History of encephaloid cancer . . . 367
Neuralgia of the thoracic parietes . . . 370
Of magnetism as a remedy in neuralgia . . . 371
Of the varieties and pathology of asthma . . . 381

PAGE
Of the treatment of asthma 386
Literature of asthma 391
Of the period of effusion in serous inflammations . . 394
Character of the effused fluid at different periods of the disease . 396
Of the mobility of the effused fluid by change of position . . 407
Of the vibration communicated to the walls of the chest in speaking, as a sign of pleurisy (*M. L.*) . . . 410
Of the physical diagnostics of pleurisy and pneumonia . . 411
Of tenderness of the exterior of the chest in pleurisy . . 413
Of the frequency and diagnosis of chronic pleurisy . . 418
Of contraction of the chest after pleurisy . . . 431
Of diaphragmitis 432
Of tartar emetic in large doses in pleurisy . . . 437
Of the operation of empyema 443
Literature of pleurisy 447
Of the existence of idiopathic hydrothorax . . . 448
Of the connexion between hydrothorax and inflammation . 450
Of the general symptoms of hydrothorax . . . 452
Of the treatment of hydrothorax . . . 453
Literature of hydrothorax 454
Of the usual origin and cause of pneumothorax . . 457
Chemical analysis of the gas in pneumothorax . . 459
Of the symptoms of pneumothorax . . . 463
Relative frequency of pneumothorax on both sides (*M. L.*) . 484
Diagnostic signs of pneumothorax and their respective value . 485
True rythm or progressive movements of the different parts of the heart 505
Non-isochronism of the ventricular systole and arterial pulse . 507
Critical examination of the opinions of authors respecting the order and causes of the motions and sounds of the heart . . 511
Of the musical bellows-sound . . . 517
Bellows-sound produced by plethora; by bronchocele (*M. L.*, & *Tr.*) 521
Origin, causes, and indications of the different valvular sounds . 522
Of the purring thrill and its relation to the rasp sound (*M. L.*, & *Tr.*) 525
Peculiar variety of intermitting pulse . . . 531
Of the general symptoms of disease of the heart . . 537
Literature of diseases of the heart in general . . 538
Of the relation of gangrene of the limbs to disease of the heart . 541
Of the causes of diseases of the heart . . . 543
Classification of the varieties of hypertrophy of the ventricles . 547
State of the pulse in hypertrophy of the left ventricle . . 548
State of the cerebral circulation in hypertrophy of the left ventricle 549
State of the complexion in hypertrophy . . . ib.
Of swelling and pulsation of the jugular veins in hypertrophy . 550
Relation of hypertrophy of the right ventricle to hæmoptysis . 551
Of the causes of dilatation of the ventricles . . 552
Relation of dilatation of the heart to enlarged liver and ascites . 554
Relation of dilatation of the heart to angina pectoris, headache, &c. 555
Dr. Hope's classification of hypertrophy with dilatation . . 557
Literature of displacement of the heart . . . 572
Literature of malformation of the heart . . . 576
Of suppurative carditis 577

PAGE
Literature of carditis and pericarditis . . . 579
Of apoplexy of the heart as a cause of rupture of the heart (*M. L.*) 581
Statistics of rupture of the heart . . . 582
Literature of rupture of the heart . . . ib.
Case of valvular disease of the heart . . . 590
Of the general symptoms of valvular disease . . 591
Of the rasp-sound and the purring-sound (*M. L.*) . . 593
Of the particular signs of valvular disease . . . 594
Of cardiac asthma 596
Literature of polypus of the heart . . . 602
Of the origin of valvular excrescences . . . 612
Of the leather-creak as a sign of pericarditis (*M. L.*) . 625
Dr. Stokes's diagnostics of pericarditis . . . 626
Of the treatment of pericarditis . . . 627
Of the auscultatory diagnostics of aneurism of the aorta . 640
Of the macerating treatment of Albertini and Valsalva, in aneurism of the aorta 643
Of hydrocyome acid and asparagus in organic diseases of the heart 644
Of digitalis in diseases of the heart . . . 645
Of the importance of removing gastric and other irritations in diseases of the heart 647
Of the nature, varieties, &c. of angina pectoris . . 651
Of the treatment of angina pectoris . . . 654
Literature of angina pectoris 656
Value of auscultation in the diagnosis of pregnancy . . 666
Literature of auscultation 670
Literature of diseases of the chest in general . . 672

A TREATISE

ON

DISEASES OF THE CHEST,

&c.

INTRODUCTION.

Of all the diseases which are essentially local, those of the thoracic organs are unquestionably the most frequent; while in point of danger, they can only be compared with organic affections of the brain. The heart, lungs, and brain constitute, according to the happy expression of Bordeu, *the tripod of life;* and none of these organs can sustain any considerable or extensive morbid change, without the greatest danger. The delicacy of their organization and their incessant motion, account for the frequency and severity of their diseases. In no other texture of the animal system is idiopathic and primary inflammation so frequent a source of severe disorder and death, as in the lungs; and no other is so liable to become the seat of *accidental productions* of every kind, more especially of tubercles, the most common of all. The heart, although of a less delicate texture, is equally obnoxious to morbid changes. Of these, it is true, some are only of rare occurrence: but others are extremely common, —for instance, thickening of its muscular substance, and dilatation of its cavities.

Diseases of the chest, in respect of their frequency and severity, hold also the first rank among those affections which, either as complications or effects, are found to accompany other diseases of a general nature. Thus in idiopathic fevers, a slight degree of peripneumony, a determination of blood to the lungs, or a catarrh occasioning redness and thickening of the internal membrane of the bronchi and pouring into them an augmented secretion of mucus,—are local affections, quite as constant in their occurrence as the redness, thickenings, or ulcerations of the mucous membrane of the intestines, in which several authors, ancient and modern, have fancied they discovered the *cause* of these diseases. It may even be asserted, that in maladies of every sort, whatever be their seat, death scarcely ever occurs without the chest becoming affected in one way or other; and that, in most cases, life does not seem in peril until the supervention of a congested state of the lungs, serous effusion into the pleura, or great disorder of the circulation. The brain in general becomes affected only subsequently to these changes; and frequently remains undisturbed even to the last moment of life.

However dangerous diseases of the chest may be, they are, nevertheless, more frequently curable than any other severe internal affection. For this double reason medical men, in all ages, have been desirous of obtaining a correct diagnosis of them. Hitherto, however, their efforts have been attended by little success,—a circumstance which must necessarily result from their having confined their attention to the observation and study of the deranged functions only. From the continued operation of the same cause, we must even now confess, with Baglivi, that the diagnosis of the diseases of this cavity is more obscure than that of those of any other internal organ. Diseases of the brain, not in themselves numerous, are distinguished, for the most part, by constant and striking symptoms; the soft and yielding walls of the abdomen allow us to examine, through the medium of touch, the organs of that cavity, and thus to judge, in some measure, of their size, position, and degree of sensibility, and also of the extraneous substances that may be formed in them. On the other hand, the diseases of the thoracic viscera are very numerous and diversified, and yet have almost all the same class of symptoms. Of these the most common and prominent are cough, dyspnœa, and, in some, expectoration. These, of course, vary in different diseases; but their variations are by no means of that determinate kind which can enable us to consider them as certain indications of known variations in the diseases. The consequence is, that the most skilful physician who trusts to the pulse and general symptoms, is often deceived in regard to the most common and best known complaints of this cavity. Nay, I will go so far as to assert, and without fear of contradiction from those who have been long accustomed to the examination of dead bodies,—that before the discovery of Avenbrugger, one-half of the acute cases of peripneumony and pleurisy, and almost all the chronic pleurisies, were mistaken by practitioners; and that, in such instances as the superior tact of a physician enabled him to suspect the true nature of the disease, his conviction was rarely sufficiently strong to prompt and justify the application of very powerful remedies. The percussion of the chest, according to the method of the ingenious observer just mentioned, is one of the most valuable discoveries ever made in medicine. By means of it, several diseases which had hitherto been cognisable by general and equivocal signs only, are brought within the immediate sphere of our perceptions, and their diagnosis, consequently, rendered both more easy and more certain. It is not to be concealed, however, that this mode of exploration is very incomplete. Confined, in a great measure, to the indication of *fulness* or *emptiness*, it is only applicable to a limited number of organic lesions; it does not enable us to discriminate some which are very different in their nature or seat; it scarcely affords any indication except in extreme cases, and cannot therefore enable us to detect, or even to suspect, diseases in their very commencement. It is more particularly in diseases of the heart that we regret the insufficiency of this method, and wish for something more precise. The general symptoms of disease in this organ greatly resemble those produced by many nervous complaints, and by the diseases of other organs. The application of the hand affords some indications as to the extent, strength, and rythm of the heart's motions; but these in general are by no means distinct, while, in cases of considerable fatness or anasarca, they become very obscure, or are altogether imperceptible. Within these few years some physicians have, in those cases, attempted to gain further information by the application of the ear to the cardiac region. In this way, the pulsations of the heart, perceived at once by the ear and touch, become, no doubt, more distinct. But even this method comes far short of what might be expected from it. Bayle was the first who to my knowledge had recourse to it, at the time when we were attending the lectures of Corvisart. This great man himself never used it: he says only that he had several times heard the pulsation of the heart in *listening very close* to the chest.[*] We shall afterwards find that this phenomenon is different from auscultation, properly so called, and is only observable in some particular cases. But neither Bayle nor any other of our fellow-students, who with myself might, in imitation of him, employ this immediate auscultation, (of which, by the way, the first notion is derived from Hippocrates,) obtained any other result from it than that of perceiving more distinctly the action of the heart, in the cases where this was not very perceptible to the touch.[†] The reason of this limited application will be stated hereafter. But, independently of its deficiencies, there are other objections to its use: it is always inconvenient both to the physician and patient; in the case of females it is not only indelicate but often impracticable; and in that class of persons found in hospitals it is disgusting. For these various reasons this measure can but rarely be had recourse to, and cannot therefore become practically useful; since it is only by numerous observations and the comparison of numerous facts of the same kind, that we can ever, in medicine, separate the truth from the errors which are constantly derived from the inexperience of the observer, from the varying fitness of his perceptive powers, the illusions of his senses, and the inherent difficulties of the method of exploration which he employs. Observations made after long intervals can never

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[*] Essai sur les Maladies du Cœur. 3e. Ed. p. 396.

[†] The practice of *Immediate Auscultation* is noticed by M. Double, in the second volume of his *Semeiologie Generale*, published two years before the first edition of the Treatise of Laennec. Speaking of the signs furnished by respiration, and of the sounds produced by it within the chest in disease, he says that, with the view of hearing them more distinctly, "we must apply the ear closely to every point of all its aspects; by which means we can distinguish, not merely the kind and degree of the sound, but even its precise site." He adds, "I have frequently derived great

benefit from this mode of investigation, which is peculiar to myself, and to which I was naturally led by the employment of the like method in exploring the pulsation of the heart." Semeiol. t. ii. p. 31. *Paris*, 1817.—Long before this period, indeed, one of our own countrymen, not of the medical profession, and who, in all probability, was unacquainted with the writings of Hippocrates, was fully aware both of the existence and great importance of internal sounds as a means of diagnosis, and, as Dr. Elliotson well observes, seems almost to have prophesied the stethoscope. I quote the more striking parts of the passage as extremely curious in the literary history of auscultation. "There may be a possibility," says Hooke, "of discovering the internal motions and actions of bodies by the sound they make. Who knows but that, as in a watch we may hear the beating of the balance, and the running of the wheels, and the striking of the hammers, and the grating of the teeth, and multitudes of other noises;—who knows, I say, but that it may be possible to discover the motions of the internal parts of bodies, whether animal, vegetable, or mineral, by the sound they make; that one may discover the works performed in the several offices and shops of a man's body, and thereby discover what instrument or engine is out of order, what works are going on at several times, and lie still at others, and the like."—"I have this encouragement not to think all these things utterly impossible, though never so much derided by the generality of men, and never so seemingly mad, foolish, and fantastic; that, as the thinking them impossible cannot much improve my knowledge, so the believing them possible may, perhaps, be an occasion for taking notice of such things as another would pass by without regard as useless. And somewhat more of encouragement I have also from experience, that I have been able to hear very plainly the beating of a man's heart; and it is common to hear the motion of the wind to and fro in the guts and other small vessels: the stopping in the lungs is easily discovered by the wheezing, the stopping of the head by the humming and whistling noises, the slipping to and fro of the joints, in many cases by crackling and the like. As to the working or motion of the parts one amongst another, methinks I could receive encouragement from hearing the hissing noise made by a corrosive menstruum in its operation, the noise of fire in dissolving, of water in boiling, of the parts of a bell after that its motion is grown quite invisible as to the eye; for to me these motions and the other seem only to differ *secundum magis et minus*, and so to their becoming sensible, they require either that their motions be increased, or that the organ be made more nice and powerful to sensate and distinguish them [to try the contrivance about an artificial tympanum] as they are; for the doing of both which I think it is not impossible but that in many cases there may be helps found, some of which I may, as opportunity is offered, make trial of, which, if successful and useful, I shall not conceal." (The Posthumous Works of Robert Hook, M.D. p. 39, 40. *Lond.* 1705, folio.)

There is no reason to believe that Laennec was acquainted with these opinions of the English philosopher; nor if he had, would this knowledge, any more than that which he derived from the writings of Hippocrates, have greatly detracted from his merits as the discoverer of mediate auscultation, and the inventor of the stethoscope.—*Transl.*

overcome difficulties of this kind. Nevertheless, I had been in the habit of using this method for a long time, in obscure cases, and where it was practicable; and it was the employment of it which led me to the discovery of one much better.

In 1816, I was consulted by a young woman labouring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on account of the great degree of fatness. The other method just mentioned being rendered inadmissible by the age and sex of the patient, I happened to recollect a simple and well-known fact in acoustics, and fancied it might be turned to some use on the present occasion. The fact I allude to is the great distinctness with which we hear the scratch of a pin at one end of a piece of wood, on applying our ear to the other. Immediately, on this suggestion, I rolled a quire of paper into a kind of cylinder and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased, to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear. From this moment I imagined that the circumstance might furnish means for enabling us to ascertain the character, not only of the action of the heart, but of every species of sound produced by the motion of all the thoracic viscera, and, consequently, for the exploration of the respiration, the voice, *the rhonchus*, and perhaps even the fluctuation of fluid extravasated in the pleura or the pericardium. With this conviction, I forthwith commenced at the Hospital Necker a series of observations from which I have been able to deduce a set of new signs of diseases of the chest, for the most part certain, simple, and prominent, and calculated, perhaps, to render the diagnosis of the diseases of the lungs, heart and pleura, as decided and circumstantial, as the indications furnished to the surgeon by the introduction of the finger or sound, in the complaints wherein these are used.

The following work, which contains the result of these observations, I shall divide into three Parts. In the First I shall detail the various methods of exploration by which we obtain a knowledge of the diseases of the chest; the Second will contain an account of the diseases of the Bronchi, Lungs and Pleura; the Third, of the diseases of the Heart and its appendages.

But before proceeding with my subject, it may be well to say something on the attempts I have made to perfect my instrument of exploration, both as to its materials and shape, in order that others, who may entertain a like design, may follow a different route.

The first instrument which I used was a cylinder of paper, formed of three quires, compactly rolled together, and kept in shape by paste. The longitudinal aperture which is always left in the centre of paper thus rolled, led accidentally in my hands to an important discovery. This aperture is essential to the exploration of the voice. A cylinder without any aperture is best for the exploration of the heart: the same kind of instrument will indeed suffice for the respiration and rhonchus; but both these are more distinctly perceived by means of a cylinder which is perforated throughout, and excavated into somewhat of a funnel shape, at one of its extremities, to the depth of an inch and a half. The most dense bodies do not, as might have been expected from analogy, furnish the best materials for these instruments. Glass and metals, exclusively of their weight and the sensation of cold occasioned by their application in winter, convey the sounds less distinctly than bodies of inferior density. Upon making this observation, which at once surprised me, I wished to give a trial to materials of the least possible density, and, accordingly, caused to be constructed a cylinder of gold-beater's skin, inflated with air, and having the central aperture formed of pasteboard. This instrument I found to be inferior to all the others, as well from its communicating the sounds of the thoracic organs more imperfectly, as from its giving rise to foreign sounds, from the contact of the hand, &c.

Bodies of a moderate density, such as paper, the lighter kinds of wood, or Indian cane, are those which I always found preferable to others. This result is perhaps in opposition to an axiom in physics; it has, nevertheless appeared to me one which is invariable. In consequence of these various experiments I now employ a cylinder of wood, an inch and a half in diameter, and a foot long, perforated longitudinally by a bore three lines wide, and hollowed out into a funnel-shape, to the depth of an inch and a half at one of its extremities. It is divided into two portions, partly for the convenience of carriage, and partly to permit its being used of half the usual length. The instrument in this form—that is, with the funnel-shaped extremity,—is used in exploring the respiration and rhonchus: when applied to the exploration of the heart and the voice, it is converted into a simple tube, with thick sides, by inserting into its excavated extremity a stopper or plug traversed by a small aperture, and accurately adjusted to the excavation. This instrument I have denominated *the Stethoscope*.* The dimensions mentioned are not a matter of indifference. A greater diameter renders its exact application to certain parts of the chest, impracticable; greater length renders its retention in exact apposition more difficult, and when shorter, it is not so easy to apply it to the axilla, while it exposes the physician too closely to the patient's breath, and, besides, frequently obliges him to assume an inconvenient posture,—a thing above all others to be avoided, if we wish to observe accurately. The only case in which a shorter instrument is useful, is where the patient is seated in bed or on a chair, the head or back of which is close to him: then it may be more convenient to employ the half-length instrument.*

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* From *στῆθος*, *pectus*, and *σκοπέω*, exploro.

In speaking of the different modes of exploration, I shall notice the particular positions of the patient, and also of the physician, most favourable to correct observation. At present I shall only observe that, on all occasions, the cylinder should be held in the manner of a pen, and that the hand of the observer should be placed very close to the body of the patient to insure the correct application of the instrument.

The end of the instrument which is applied to the patient,—that, namely, which contains the stopper or plug,—ought to be slightly concave, to insure its greater stability in application; and when there is much emaciation, it is sometimes, though rarely, necessary to insert between the ribs a piece of lint or cotton, covered with cloth, on which the instrument is to be placed, as, otherwise, the results might be affected by its imperfect application.

Some of the indications afforded by mediate auscultation are very easily acquired, so that it is sufficient to have heard them once to recognise them ever after: such are those which denote ulcers in the lungs, hypertrophy of the heart when existing in a great degree, fistulous communication between the bronchi and cavity of the pleura, &c. There are others, however, which require much study and practice for their effectual acquisition.

The use of this new method must not make us forget that of Avenbrugger; on the contrary, the latter acquires quite a fresh degree of value through the simultaneous employment of the former, and becomes applicable in many cases, wherein its solitary application is either useless or hurtful. It is by this combination of the two methods that we obtain certain indications of emphysema of the lungs, pneumo-thorax, and of the existence of liquid extravasations in the cavity of the pleura. The same remark may be extended to some other means, of more partial application, such, for example, as the *Hippocratic succussion*, the *mensuration* of the thorax, and *immediate* auscultation; all of which methods, often useless in themselves, become of great value when combined with the results procured through the medium of the stethoscope.

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* The stethoscope has undergone various modifications of form since the time of Laennec, but I am of opinion that the one last used and recommended by him is still the best,—with this only alteration, of having the stopper made conical in place of being rounded. In the modification of the stethoscope, now very commonly used and originally introduced by M. Piorry, too much has been sacrificed to portability and elegance. It is, as is well stated by Dr. Williams, (Cyc. of Pract. Med. vol. iv.) faulty in having the conducting power of the wood impeded by screws and a thick cap of ivory; besides which the excavated end is generally very ill fitted. The following observations by the same author are very just, and deserving the attention of the young auscultator:—"The general excellence of this instrument will depend on the smoothness and true turning of the interior, and the perfect adaptation of the stopper to the cavity; but to be fully available to the auscultator, the auricular end should be made wide or narrow, flat or concave, to fit comfortably to his ear. Generally it will be found useful to make this end slightly concave, and somewhat wider, by a ferule of ivory or ebony, than the general diameter of the instrument, or this width may be formed in the wood itself. A beginner should not choose a stethoscope hastily, but when one is found exactly to fit the ear, a more perfect tact will be acquired by keeping to the same instrument than by using a variety." Cyc. of Pr. Med. vol. iv. Art. *Stethoscope.*—The flexible caoutchouc tube terminating in a small ivory funnel, now in common use by deaf persons, is employed by some auscultators, and in some respects answers the purpose well enough; but it is in others decidedly inferior to the solid instrument. (See Plate at the end.)—*Transl.*

In conclusion, I would beg to observe, that it is only in an hospital that we can acquire, completely and certainly, the practice of this new art of observation; inasmuch as it is necessary to have occasionally verified, by examination after death, the diagnostics established by means of the cylinder, in order that we may acquire confidence in the instrument and in our own observation, and that we may be convinced, by ocular demonstration, of the correctness of the indications obtained. It will be sufficient, however, to study any one disease in two or three subjects, to enable us to recognise it with certainty; and the diseases of the lungs and heart are so common, that a very brief attendance on an hospital will put it in the power of any one to obtain all the knowledge necessary for his guidance in this important class of affections.

It would no doubt be expecting too much of physicians actively engaged in private practice, to devote much time to the acquisition of this knowledge in an hospital; but they may readily and compendiously obtain the necessary opportunities through the kindness of friends attached to these establishments, who can make them acquainted with rare or interesting cases as they occur. In this way there is no physician who may not, in a very little time, learn to recognise with certainty not only the cases above mentioned, but peripneumony, pleurisy, latent catarrhs, and even the very rudiments of these affections: and this last-mentioned circumstance is unquestionably the chief practical benefit of auscultation, inasmuch as these diseases are the more easily cured, according as they are subjected to early treatment.

PART FIRST.

OF THE EXPLORATION OF THE CHEST.

CHAPTER I.

OF THE MORE ANCIENT METHODS.

In every age physicians have felt the insufficiency of those equivocal symptoms, deduced from the general condition of the patient and the disturbance of the functions, to make known internal diseases, and have accordingly endeavoured to discover *physical* signs which might be immediately cognizable by the senses. It is with this view that almost all the methods of exploration used in surgery have been, at different times, applied to the study of diseases of the chest; such as examination by the hand, inspection of the shape and motions of the thorax, mensuration, succussion, and finally, immediate auscultation. But owing to the infrequency of the instances wherein these methods are productive of any useful result, the inconvenience and fatigue —both to the patient and physician—of some of them, and, more especially, the very little benefit hitherto derived from them, they had all fallen into such disuse as, a few years ago, to be almost unknown to practitioners. I think it however necessary, in this place, to examine their respective value, and shall add to those already named, some of more modern origin.

Sect. I. *Manual examination of the exterior of the chest.*

The physical structure of the chest prevents our obtaining any accurate information respecting the condition of the organs contained in it, by the act of touching or handling it externally. Fluctuation in the intercostal spaces, reckoned by some authors among the signs of fluids collected in the pleura or pericardium, can only be observed in cases where the fluids have penetrated the intercostal muscles and become extravasated beneath the skin, or in the still rarer instance where the intercostal spaces are rendered prominent by the pressure of the fluid within the chest.

The simple application of the hand would seem to furnish some signs of greater utility; for when a person in health speaks or sings, his voice excites in the whole walls of the thorax a sort of vibration, which is easily perceived on applying the hand to the chest. This phenomenon is no longer observable, when, through disease, the lungs have ceased to be permeable to the air, or are removed from the walls of the chest by an effused fluid. This sign is, however, of inferior value, since a great many causes occasion varieties in the intensity of the vibration, or completely destroy it. For instance, it is little sensible in fat persons, in those whose integuments are rather flaccid, and in those who have a sharp and weak voice. Anasarca of the chest completely destroysit, even when the lungs are quite sound. In any case it is only very perceptible at the anterior and superior part of the chest, on the sides, and in the middle of the back. From these and other causes we can derive little practical benefit from attending to this particular circumstance. We can only presume that that portion of the lungs where it exists is permeable to the air; but are not justified in drawing any conclusions from its absence.

Notwithstanding the inefficacy of this method, I have frequently employed it in practice, and the following are the results obtained:—1. In cases of abscess of the lungs communicating with the cellular substance of the exterior of the chest, I have sometimes perceived a sensation indicative of the passage of the air through the fluid. 2. In cases of extensive tuberculous excavations very near the surface of the lungs, and when these were also attached to the costal pleura, I have sometimes perceived a distinct guggling on the application of very gentle percussion or by merely pressing or touching the part.* 3. In suffocative catarrh, or the *rattles* of dying persons, when very strong, a similar guggling is perceived. 4. I believe that a similar result is produced by the effusion of the pus of an abscess of the lungs, or of the softened matter of a tubercle, into the pleura, in those cases where the pulmonary and costal pleura are intimately united by previous disease. 5. In certain subjects, the hand is sensible of a vibration, resembling that of a fiddle-string when touched, recurring after long intervals, and only momentarily. This phenomenon, which is of slight importance, and may have place even in a trifling catarrh, is occasioned by the contraction of some bronchial ramification near the surface of the lungs, as is proved by the employment of the stethoscope.

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* The same circumstance has been observed by Andral, and is distinctly stated in the third volume of his Clinique Medicale, p. 66. It will be more particularly noticed when treating of the diagnosis of Phthisis.—*Transl.*

6. Sometimes in cases of emphysema of the lungs, particularly the interlobular emphysema, a species of *dry crepitation* is felt by the hand. 7. Sometimes also we can perceive the fluctuation which takes place in a very large tuberculous excavation, or where there exists an effusion of air and fluid in the pleura at the same time, on the patient moving the chest quickly: in this case, however, we *hear* the fluctuation still more distinctly.

From all this it may be concluded that the application of the hand to the walls of the chest, is of very inferior value as a means of diagnosis in diseases of the lungs and pleura, and that even where its indications are of any value, they are in some measure superfluous, inasmuch as the stethoscope furnishes us with others which are more constant and certain.*

The application of the hand to the region of the heart was, for a long time, the chief means employed by the ancient physicians to judge of the strength, weakness, or other characters of the pulse; but the indistinctness of the sensations communicated generally, and the impossibility of perceiving at all the heart's action in many cases, have justly given the preference to the examination of the radial artery. Similar obstacles prevent us from deriving any benefit from this mode of exploration in most diseases of the heart. A very marked pulsation frequently indicates nothing more than thinness of the thoracic parietes, or a state of mere nervous agitation; while, on the contrary, there sometimes exists no perceptible pulsation even in cases of hypertrophy, or great dilatation of the organ. There is only one sign of some value obtained by the application of the hand,—I mean the thrilling sensation analogous to the purring of a cat, which I shall have occasion to notice hereafter.

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* There are only a few circumstances relating to the physical condition of the chest which cannot be ascertained without the direct application of the hand. Of this kind is soreness or tenderness of the surface. Much tenderness of the surface of the chest on simple touch usually indicates an affection of the external parts, either of the skin or muscles, as in the rheumatic affection termed *pleurodyne*. It is, however, sometimes produced by internal diseases, as when a collection of pus in the pleura is making its way outwards by perforation of an intercostal space. When, however, considerable pressure is made in the intercostal spaces, pain is very frequently experienced in pleuritic affections, more particularly of a chronic kind. In chronic pneumonia also, and in phthisis, when the lungs, as frequently happens, are adherent to the costal pleura, the same effect is frequently observed; and in cases of this kind I have often found much uneasiness produced by even the gentlest percussion, more particularly if made without the pleximeter.

A preternatural degree of temperature of any part of the surface of the body has been always considered indicative of disease of the particular part, or of the tissues or organs which lie beneath it. The same rule is, no doubt, equally applicable to the diseases of the chest; but although the fact may be so, it is interesting more as a pathological phenomenon than as a means of diagnosis, as it scarcely ever exists where we are not provided with more certain indications.

Manual examination discovers the presence and degree of muscular robustness, obesity, or emaciation, also œdema, emphysema, &c. with much greater certainty and accuracy than mere inspection: it also enables us to judge of the natural degree of thickness of the thoracic parietes, a circumstance sometimes of considerable importance in appreciating the value of other signs derived from different methods of physical exploration.—*Transl.*

SECT. II. *Inspection of the exterior of the chest, and mensuration.*

The inspection of the naked chest enables us to perceive any alteration in its shape, and to judge, at least to a certain extent, of the changes which have taken place in the motions of the organs it contains. It makes us acquainted with the alterations produced by rickets, and also with the important fact of dilatation of the chest in cases of extravasation of the fluids within it, and of its contraction in ulterior stages of some of the same diseases which occasion its dilatation. It enables us to detect, in certain cases, aneurisms of the aorta in their latter stages.

Mensuration, by means of a cord or ribbon, of the two sides of the chest, for the purpose of ascertaining their relative size, has never afforded me any very useful results. The difference of half an inch in the semi-circumference is very perceptible to the eye: and when the difference is less than this, we cannot depend so entirely on the accuracy of our admeasurement, as to feel more confidence in their results than in those derived from simple inspection.[*]

The inspection of the movements of the thorax has always been considered as affording information as to the degree of perfection or imperfection of respiration. It has been particularly had recourse to by veterinary surgeons, not so much, however, to enable them to judge accurately of disease, and to prescribe the proper treatment, as to aid them in ascertaining the value of the animal from the habitual condition of its respiration.[*] In this respect they are greatly assisted by the nudity of the subject. It is very different with our patients; to whom the operation of uncovering the chest is attended with so many inconveniences, that it is no wonder that this method of exploration has been more recommended than practised. Some physicians content themselves with causing their patients to take a few deep inspirations, without uncovering; but it is obvious that this plan is altogether useless. Indeed, as far as concerns diagnosis, the inspection of the naked chest is almost equally defective. The respiration is considered natural when the anterior and lateral parts of the chest dilate equally, distinctly, yet moderately, during inspiration, and when the number of inspirations in a state of repose is from twelve to fifteen in the minute. If the abdomen dilates with comparatively much greater force than the chest, the respiration is named *abdominal;* if the contrary obtains, it is called *pectoral.* This last variety is especially observed in certain painful affections of the abdomen: but the diagnosis of these, especially of peritonitis, is so easy as to render this additional means almost superfluous. The abdominal respiration and the defective or diminished dilatation of the chest, are very generally considered as constantly accompanying extravasations into the pleura, and every kind of pulmonary obstruction. This opinion is, however, by no means correct. We shall afterwards show that the extreme dilatation both of the abdominal and thoracic parietes in inspiration, occasionally coincides with the most perfect respiration, as far as regards the action of the lungs and expansion of the air-cells, and merely indicates an increased need of respiration, of a purely vital character: while, on the other hand, a diminished expansion of the same parts indicates a condition merely the reverse, and which is found to vary according to age, the state of wakefulness or sleep, of motion or repose, and of calmness or agitation of mind. Besides, I have never been able to ascertain a constant and very obvious inequality of action in the two sides of the chest, except in cases of empyema with very large effusion or of deformity, while I have repeatedly assured myself that the dilatation was equable in phthisical subjects, whose lungs were very unequally charged with tubercles, and likewise in cases of peripneumony and pleurisy confined to one side.[†] It is hardly necessary to state that anasarcha, fatness, and very large mammæ, will greatly obscure the motions of the chest.

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[*] Andral's opinion differs somewhat from our author's in this point. He says that when one side exceeds the other by five or six lines, the difference is very perceptible to the eye, but adds, that mistakes are very likely to be made in this respect, and advises mensuration always to be had recourse to.—Op. Cit. Tom. ii. 565.—I agree with Andral in considering mensuration as of more practical value than our author is disposed to admit. Many persons differ respecting extent as measured by the eye; actual physical results cannot be called in question. As the contraction or dilatation may be in both the transverse and vertical directions, it is necessary, if we wish to be extremely precise, to make two admeasurements, one from the spine to the sternum, the other from the top of the shoulder to the lowest rib. In general, however, the transverse admeasurement is all that is requisite. In measuring the two sides, we must be careful to apply our tapes in a precisely similar manner to each side. In ascertaining the transverse extent, we first make our measurements after a complete expiration, and then after a full inspiration. It will thus frequently be seen that, although little or no difference is found between the two sides in the former case, it is very considerable in the latter,—the chest on the diseased side not at all expanding during inspiration, and probably expanding even more than in the state of health on the sound side. This effect is rendered particularly striking by fixing the *middle* of the piece of tape on the spine, and allowing the two ends to rest somewhat loosely on the sternum, so as to be moved by the motions of the chest: on the patient taking a deep breath, the end on the sound side is seen gradually to recede from the sternum, while that on the diseased side either remains stationary, or recedes to a very small extent. In cases of contracted chest succeeding acute pleurisy, in which a cure had been effected, it is interesting to watch month by month, the gradual expansion of the contracted side. In such instances we have been accustomed to supply the patient with a marked piece of tape, and have been gratified to prove by this means, at certain intervals, the progressive return of the chest to its natural size.—*Transl.*

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[*] I learn from an eminent Veterinary Surgeon in London, that it is the practice with this class of practitioners, in examining the soundness of a horse, to attend to the *sound* of the respiration also, by the application of the ear to the vicinity of the trachea.—*Transl.*

[†] Andral states (Clin. Med. t. iii. 97.) that there will be observed a greater or less degree of immobility of the thoracic parietes over the site of a large accumulation of tubercles; and he regards it as indicating, moreover, the presence of a chronic inflammation developed in the lung around the tubercles or tuberculous cavities. He has observed it chiefly between the clavicle and nipple: it is almost constantly

The pulsation of the heart is visible in some persons between the cartilages of the fifth and seventh ribs. This is particularly the case in children and thin subjects, with small bones and narrow chests, but is no indication whatever of disease.

From these considerations it must be concluded, that the inspection of the motions of the chest during respiration, is of little utility. Taken by itself it merely shows that the respiration is impeded, a circumstance equally pointed out by the frequency of the inspirations; while in conjunction with percussion and mediate auscultation it becomes altogether superfluous; as I do not know a single case wherein it can add any thing to the certainty of the results obtained by them.

In lean subjects we can sometimes distinctly perceive the effect of the expansion and contraction of the lungs, in the alternating prominence and depression of the intercostal spaces of the cartilages of the upper false ribs; but I have never had occasion to make any useful application of this phenomenon to diagnosis.*

SECT. III. *Succussion of the chest.*

By succussion I mean the mode of exploration used by Hippocrates or some of his early disciples, as a means of discovering the presence of fluid in the cavity of the thorax. This method being only useful in two particular cases, I shall defer noticing it until I come to treat of Pneumo-thorax complicated with liquid effusion.

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conjoined with a dull sound on percussion. Dr. Meriadec Laennec has never observed this partial immobility of the walls of the chest, and argues against its probability. I have certainly observed it.—*Transl.*

* I think that the author has, in this section, somewhat underrated the value of the inspection of the motions of the chest, as a means of diagnosis. To those who do not employ percussion or the stethoscope, this method of exploration is especially valuable, and leads to important practical results, when the pulse and tongue give us no information, or mislead us. In phthisis which has been very slow in its progress, and when tubercles exist in both lungs, as usually happens, we find both sides of the chest contracted, particularly in the subclavian regions. In asthma, on the contrary, both sides are usually considerably dilated, more particularly about the middle of the chest, and rendered much more convex both before and behind. In old asthmatics this configuration of the chest is sufficiently conspicuous, even when the body is covered. Its presence is always a proof of a permanent dilatation of the pulmonary cells, and, generally, of an incurable disease. It is only by inspection that we can ascertain certain conditions of the mere surface, which are, however, often of importance to diagnosis. Of this kind are œdema of a portion of the chest, the relative width of the intercostal spaces, their degree of prominence, &c. For ampler details on this subject I beg leave to refer the reader to Double—*Séméiologie Generale*, tom. ii.; Landré-Beauvais—*Séméiotique*, p. 36; Collin—*Exploration de la poitrine*, p. 5, and also to the second and third volumes of Andral's *Clinique Medicale*; and to the article *Chest, Exploration of*, in the Cyclopædia of Pract. Med.—*Transl.*

SECT. IV. *Abdominal pressure.*

This method, introduced by Bichat,* consists in pressing forcibly upon the hypochondres from below upwards, and watching the degree of suffocation and distress produced by it. I think this proposal can only be regarded as an unlucky notion incautiously dropped by a man of fine genius. Bichat had himself scarcely made trial of this plan, when he was cut off in the prime of life, and would, no doubt, have abandoned it after a little experience. The relative degrees of oppression produced by it in empyema, peripneumony, and the different kinds of asthma, could never be admitted as signs deserving confidence, more especially as a high degree of suffocation is produced by it in persons of a delicate and nervous habit, though in other respects perfectly healthy. But even if this method were capable of supplying us with more positive indications, it ought hardly to be had recourse to, since we are not permitted to put our patients to the torture, whatever be our zeal in interrogating nature.†

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* Memoire sur la pression abdominale, par M. Roux, Œuv. Chirurg. de Desault, tom. iii. Paris, 1813.

† In addition to the Memoire of M. Roux above referred to, the reader may consult Corvisart's work on Diseases of the Heart, (2d Edit. p. 375,) and the Article *Pression Abdominale*, by Merat, in the 45th Vol. of Dict. des Sec. Med.

It has been endeavoured to ascertain the capacity of the chest, or rather of the lungs, on another principle, namely, by ascertaining the quantity of air the lungs were capable of containing. This method was proposed by the late Mr. Abernethy. It is obvious that it does not lead to the same results as mensuration of the external surface of the chest; this latter giving the capacity of the containing, the former the capacity of the contained parts. Mr. Abernethy's method consists in making the patient take as deep an inspiration as possible, and then expire through a bent tube communicating with an inverted jar containing water. The quantity of water displaced by the air is a measure of the capacity of the lungs to contain air. A person in good health with sound lungs is able to displace six or eight pints; and if the amount be greatly less than this, as for example, only one-third or one-quarter, it may be inferred that the lungs are either obstructed by disease of their own substance, or compressed from without. "Muscular debility or spasm," says Mr. Abernethy, "may occasionally make the result of this experiment doubtful, yet in general I believe it will afford useful information." (Essays, Part II. p. 157.) In this judgment I agree with Mr. Abernethy.

A more simple test of the capacity of the lungs, founded on the same principle, has been proposed. (Edin. Med. Jour. vol. xxxviii. p. 453.) It consists in measuring the comparative length of time occupied in making a complete expiration after a complete inspiration. With the view of proving that the expiration is continuous, the patient is desired to *count* from one upwards, as far as he can, slowly and audibly; and the number of seconds during which he is able to count, without drawing breath, is noted by a watch: the number of seconds is considered a proportional sign of the quantity of air expired, and consequently of the capacity of the lungs. Dr. Lyons, who proposes this method, says, that the most healthy individual will not continue counting beyond thirty-five seconds; but in this he is certainly mistaken, as any of my long-winded readers may prove by personal experiment. In confirmed phthisis, Dr. L. says, the period of expiration never exceeds eight, and is frequently less than six seconds; while in pleurisy and pneumonia it may range from four to nine. This test is of much easier application than Mr. Abernethy's, but it is much less accurate: it is liable to vitiation from many causes, but still, like Mr. Abernethy's, it may be occasionally useful.—*Transl.*

CHAP. II.

OF PERCUSSION.

THE chest of a healthy person when slightly struck, ought to yield over its whole extent, more particularly in its anterior and lateral parts, a clear and distinct sound, owing to the presence of the air, which constantly fills the lungs, and consequently a great portion of the cavity of the thorax. This fact was no doubt known to the ancients; and in our own times there are few persons who have not seen the common people striking their chests, and congratulating themselves on the good hollow sound thus produced. From the knowledge of this fact, to the conclusion that the same sound cannot exist in cases where the lung is obstructed, or the cavity of the pleura filled with fluid, seems but a step; and yet this reflection appears never to have occurred to any one, until made by Avenbrugger, about the middle of last century. After seven years silent investigation, and, as he himself tells us, amid laborious and disgusting researches *(inter labores et tædia,)* he gave his discovery to the world, in a small pamphlet. The only reward he seems to have obtained for his fine discovery, was a slight notice of it by Van Swieten and Stoll: this however failed to attract the attention of his contemporaries, and he died, without ever perhaps dreaming of the celebrity which his discovery was destined to obtain. Corvisart is entitled to the honour of withdrawing this method from the oblivion into which it had fallen, after a period of thirty years, and of making all Europe, and even the native country of its author, acquainted with its merits.[*]

This method has the advantage of not requiring the use of any instrument; yet, although very simple, it requires long habit, and a degree of dexterity which many persons are incapable of acquiring. The slightest variation in the inclination under which the fingers strike the chest, may give rise to the belief of a difference of sound which in reality does not exist. A person who has acquired by experience a certain degree of perfection in practice, can elicit much, little, or no sound at all, from a chest perfectly sonorous; the same results are frequently obtained involuntarily by physicians not sufficiently experienced; some of whom, moreover, cannot elicit sufficient sound without employing a degree of force which is painful to the patient.

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[*] Auenbrugger was born in Graets in Styria, in 1722. He graduated at Vienna, and afterwards became physician in ordinary of the Spanish nation, in the imperial hospital of that city. In Erssh and Puchelt's *Literatur der Medecin* he is recorded as the author of two other medical works, relating to madness, one in Latin, published in 1776, and the other in German in 1783. In the same record Auenbrugger is stated to have died so late as the year 1809, in the 87th year of his age. The work on Percussion was first published in 1761, under the title of "*Inventum novum ex Percussione thoracis humani, ut signo, abstrusos interni pectoris morbos detegendi.*" It was first translated into French so early as the year 1770, by Roziere, but appears to have drawn little attention at the time. Corvisart's translation was published in 1808. The only English translation of this work was published in 1824, with a selection of Corvisart's Commentaries, and additional Notes by the translator of the present Treatise. See "Original Cases, &c. by John Forbes, M.D. London, 1824." It is stated in the notice of Lancisi, in the *Biographie Medicale* (t. 5, p. 502,) that this physician was in the habit of employing percussion on the sternum as a means of diagnosis; but upon recently referring to the two works of this celebrated author which treat of diseases of the chest, (*De Subitaneis Mortibus* and *De Motu Cordis et Aneurismalibus,*) I cannot find any indication of the alleged fact.—*Trans.*

Mode of Percussion. The patient ought, if practicable, to be either seated or standing; if in bed, the mattress, still more the pillows, and also thick curtains always render the sound less. The chest ought to be covered with a thin dress, or the physician should have a glove on. This precaution, originally recommended by Avenbrugger, is particularly necessary, inasmuch as the contact of the naked hand and skin occasions a sort of clatter which renders the pectoral sound less perfect and distinct.* It is better that the chest should be covered and the hand naked, since the glove necessarily diminishes the sensibility of the touch, and because the sensation of elasticity perceived by the operator, frequently confirms his judgment in cases where the difference of sound is only doubtful. In every case the perception of the sense of fulness or emptiness conveyed by percussion is much stronger to the operator than the mere by-stander. Percussion ought to be made with the four fingers united in one line, the thumb being placed, in opposition to them, at the junction of the second and third phalanges of the index, and used merely in maintaining the fingers in close and strong apposition. We must strike with the *ends* and not the face or pulpy portion of the fingers, not obliquely but perpendicularly, and gently and quickly, that is, raising the hand immediately from the skin.

When we percuss comparatively the two sides of the chest, we must be careful to strike successively on parts that are similar, with a like force and under an equal angle: for instance, we must not strike one side in a direction parallel with the ribs, and across them on the other. The omission of these precautions frequently leads to errors of consequence. If we keep the fingers united in a bundle or mass, and not in a line, or apply them under an oblique angle, so that their face and not their ends come in contact with the chest, or if we use too much force, or permit the fingers to rest after the blow is struck, we elicit less sound. We ought, in general, to apply percussion to the bones, and not to the intercostal spaces, and to strike the anterior and lateral parts of the chest, in a direction parallel to the ribs. If, however, the intercostal spaces are not very sensible, as frequently happens in fat or phlegmatic persons, it is better to strike across the ribs. On the back we cannot do otherwise on account of the thickness of the muscles; and here we ought to prefer the angles of the ribs as being least covered, and therefore affording the best sound. In any point where the muscles covering the ribs are thick, flabby, or relaxed, we should endeavour to procure their tension.* With this view, when we apply percussion over the pectorals, we cause the patient to keep the trunk erect, the shoulders thrown back, and the head elevated; and in applying it over the muscles at the side of the spine or which cover the scapula, we direct the arms to be crossed, the head to be stooped, and the back to be rounded. In percussingthe axilla and side, we cause the arm to be raised and the hand to be placed above the head. If the muscles are very much relaxed, or if there is œdema or a flabby fatness, it is often useful to stretch and compress the integuments with two fingers of the left hand, and to strike between. In the case of children and lean persons, it is found sufficient to percuss with the extremity of one finger. In subjects whose chest is naturally very sonorous, or where we merely wish to verify results already known and easily obtained, we may operate more expeditiously by using the flat of the hand, taking care not to apply the palm. This method, however, is less to be depended on, inasmuch as the percussion extends over too large a space, and is somewhat different under each finger. In these cases I occasionally employ, and with more success, the stethoscope, in percussing rapidly the parts on the back, especially where the muscles are flabby, and find that I can elicit in this manner a greater sound with less force of percussion.

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* This injunction of having the chest covered, so strongly insisted on by the original proposer of the practice and by our author, seems to me of inferior consequence, as far as the accuracy of diagnosis is concerned. In my own practice, I have often followed the interdicted method, and without any inconvenience, as far as I am aware. A much greater authority, Corvisart, did the same: and he gives it as his opinion that percussion may be equally well performed in one way as the other. (See his Translation of Avenbrugger, p. 20.) He however says, that it may be well for beginners to attend to the precaution recommended by Avenbrugger. I would further add, that if the operation can be equally well performed over a garment, (as no doubt it can,) there are very obvious reasons for giving this mode the preference. Our author omits to state the additional and very necessary precaution, given by Avenbrugger, of drawing the shirt or other covering *tight* over the place.—*Trans.*

When we obtain from percussion only a slight difference of sound on the two sides, leaving the result doubtful, it is adviseable to repeat the operation, in changing our position to the other side of the patient: in this manner we frequently obtain a result entirely different, the side most sonorous in the former trial yielding now a sound inferior to the other. This precaution is never to be omitted in doubtful cases; for, I repeat it, percussion yields exact results in the hands of those only who bring to its exercise experience, dexterity, and much attention.*

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* This is less necessary in mediate percussion; indeed it is often proper, in this method, to keep the muscles relaxed.—*Piorry*, Du Procédé Operatoire. Paris, 1830.—*Transl.*

Character of the sound derived from Percussion. This is different in the different parts of the chest; on which account I shall divide its surface into fifteen regions, twelve of which are double.

1. *Subclavian region.* This includes merely the portion of the chest covered by the clavicle. When struck about the middle or sternal extremity, this bone yields a very clear sound; its humeral extremity on the contrary yields a rather dull sound. The knowledge of the natural and morbid sound of the chest in this region is very important, inasmuch as from it are usually derived the first signs of the development of tubercles in the lungs.† When the clavicle is more distant from, or closer to, the chest than usual, in consequence of the more arched or straighter form of this bone, the sound is less distinct: this is especially the case in the latter condition of the clavicle.

2. *Anterior-superior region.* This is bounded by the clavicle above and the fourth rib (inclusive) below. The sound is here naturally very clear, but somewhat less so, however, than over the sternal end of the clavicle.

3. *Mammary region.* This begins below the fourth rib and terminates with the eighth. It can rarely be percussed in females; and in the male it seldom yields so good a sound as the anterior-superior region, on account of the thickness of the inferior edge of the pectoralis major.

4. *Submammary region.* This extends from the eighth rib to the cartilaginous border of the false ribs. On the right side, it almost yields a dull sound on account of the size of the liver; while on the left side, it frequently yields a clearer sound than natural, and which may be called almost tympanitic, owing to the presence of the stomach distended with gas. In very rare instances the unusual size of the spleen may occasion the dull sound.‡

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* As the intensity of sound depends partly on the quantity of air, it follows that the results of percussion will be modified by the particular time, in the act of respiration, at which it is performed; and as we are always desirous of eliciting as loud a sound as possible, it is generally preferable to percuss during or immediately after inspiration, when the lungs are full; and not during or after expiration, when they are comparatively empty. In obscure cases, it is frequently necessary, or at least proper, to make the patient take a deep inspiration, and then retain his breath for a few seconds, while we operate.—*Transl.*

† It is now well known that tubercles occupy the upper lobes of the lungs, earlier and in greater quantity, than the other lobes. See the Chapter on Phthisis in this work, See also Louis's *Recherches sur la Phthisie,* Chap. II. p. 224.—*Transl.*

‡ Andral is of opinion that the dulness of this region on the left, owing to the presence of the spleen, is of more frequent occurrence than is commonly imagined. Tom. ii. p. 338.—*Transl.*

5. *Sternal regions—superior, middle, and inferior.* Over the whole extent of the sternum the sound is as clear as on the sternal end of the clavicle. In certain cases, however, particularly in very fat persons, the lower portion of the sternum yields a duller sound, on account of the great quantity of fat about the heart.*

6. *Axillary region.* This extends from the upper part of the axilia to the fourth rib inclusive; it yields naturally a clear sound.

7. *Lateral region.* This is bounded by the fourth rib above and terminates with the eighth. The sound in this region is always good on the left side; on the right, it is frequently much less, owing to the liver rising higher than usual, and thereby compressing the lung upwards, and rendering it more dense and less charged with air. The liver itself never extends above the level of the sixth or fifth rib, at least when sound.

8. *Inferior lateral region.* This is bounded above by the eighth rib and terminates with the border of the false ribs. For the reasons just mentioned, this region on the right side yields a completely dull sound, and is almost always much less sonorous than the left. This last, on the contrary, for reasons also already stated, frequently yields a clearer sound than natural, and this even when the inferior portion of the lung is obstructed, or there exists an effusion of fluid in the pleura.

9. *Acromion region.* This is comprehended between the clavicle, the upper edge of the trapezius muscle, the head of the humerus, and the lower part of the neck. Here there is no sound whatever, the soft parts in this place yielding passively to the percussion.

10. *Upper scapular region.* This corresponds to the supraspinal fossa of the scapula, and hardly yields any sound on account of the muscle that fills it. The spine of the scapula, which bounds this region below, sometimes yields a slight sound, but never considerable, and this only when the arms are very forcibly crossed.

11. *Lower scapular region.* This corresponds to that portion of the scapula below its spine, and yields no sound, on account of its muscles.

12. *Inter-scapular region.* This includes the space between the inner margin of the scapula and the spine, when the arms are crossed on the breast. It is not easy to elicit any sound from it, on account of its muscles. Sometimes, however, it

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* Avenbrugger considers this diminution of sound, under a part of the sternum as general. His words are—"Sternum totum percussum resonat ita clare ac thoracis latera, excepto illo loco, cui cor pro parte subjacet; ibi enim paulo obscurior sonus percipitur." The opinion of Corvisart coincides with that of our author. I have myself frequently found the sound dull in this point, when there was no reason to suspect disease of the heart.—*Transl.*

yields a middling but sufficiently distinct sound, especially in thin persons, and when the arms are strongly crossed and the head bent, so that the rhomboid and trapezius muscles are made quite tense. The spine in this region gives a good sound, as does also that portion of the chest included between the inner and upper angle of the scapula and the first dorsal vertebra.

13. *Inferior dorsal region.* This begins at the level of the lower angle of the scapula and terminates at the twelfth dorsal vertebra. To elicit from this region all the sound it is capable of yielding, we ought, especially in fat subjects, to endeavour to find the angle of the ribs, and to percuss on that point in a transverse direction. In the upper part of the region, the sound is pretty good; a little lower it is often slight or none, and on the right side it is almost always obscure, on account of the presence of the liver. On the left side it frequently yields the factitious sound so often mentioned as owing to the presence of the stomach.[*]

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[*] Independently of the relative sonorousness of different parts in the same chest, general differences occur in different individuals, which it is not always easy to account for; some chests being very sonorous, and others comparatively dull. This might be expected, *à priori*, when the complexity of the structure of the contained and containing parts is considered. The greater or less degree of robustness, fatness, &c. has certainly an obvious effect; lean persons having always, *ceteris paribus*, more sonorous chests than those who are fat. This is one reason why percussion frequently fails to detect the presence of tubercles in the lungs, the increase of sonorousness from the extenuation of parietes compensating for the augmented dulness of the viscus within. In children generally, the chest is very sonorous. This may partly arise from the small degree of development of their muscles, and the absence of fat; but it is probably, also, in part owing to the peculiar relations of the lungs to the air, in this age.

M. Piorry has recently given, in his work on *Mediate Percussion*, a different division of the surface of the chest, into regions. It is in some respects even more artificial than that of our author, and I am not aware that it has any superior practical advantages. It is very desirable, for the sake of brevity and clearness in description, as well as for the precision in diagnosis, that some fixed division should be adopted.

In the article *Abdomen, Exploration of*, in the first vol. of the *Cyclopædia of Pract. Med.* I have given a sketch of a regional subdivision of the trunk of the body, simpler than that of Laennec or Piorry, and based on somewhat firmer grounds. In this I went upon the fundamental principle of defining every region accurately, in every individual case, by drawing all the lines perfectly straight, and between points that are at *once* fixed in their nature and obvious to the senses. By these means there can never be any doubt as to the intended place or extent of particular regions, whatever objections may be raised against the propriety of the divisions. The abdomen and chest are comprehended in the same plan, but I shall only notice in this place the thoracic regions. The vertical lines having relation to the chest are eight in number, and run as follows:—1. along the middle of the sternum from its upper to its lower extremity; 2. from the acromial extremity of the clavicle to the external tubercle of the pubes (right and left); 3. from the posterior boundary of the axilla, or inferior edge of the latissimus dorsi, to that point of the crest of the ileum on which it falls vertically (right and left); 4. along the spinous processes of the cervical and dorsal vertebræ; 5. along the posterior or spinal border of the scapulæ, from the clavicular transverse line to the mammary transverse line. The horizontal or transverse lines are four in number, and are as follows:—1. around the lower part of the neck, sloping downwards to the upper end of the sternum anteriorily, and to the last cervical vertebra posteriorily; 2. around the upper part of

Percussion of the chest has great advantages over the methods already noticed. It enables us to detect the existence of an obstruction of the lungs or an effusion into the pleura of a moderate extent; but it cannot discriminate these from each other. Many causes, moreover, conspire to circumscribe the number of cases in which it is of use. We have just seen that in many places of the chest it gives no satisfactory result, and it was formerly stated that its chief indication (that of *fulness*) is not obtained in pulmonary diseases until the organic change is already far advanced. Its indications are very equivocal when the disease occupies the centre or roots of the lungs, or when both lungs are simultaneously affected; they are deceptive when the chest is deformed even in a slight degree; and they are extremely uncertain or cease entirely when the integuments are œdematous or loaded with fat, and yet more, when they have become flabby from the removal of this excessive degree of obesity.

We occasionally also meet with cases where the chest, even of spare subjects, sounds very badly, and equally so over its whole surface, although the respiration is found to be good on the application of the stethoscope. I am unacquainted with all the causes of this phenomenon; but the most common has appeared to me to be a slight and equal contraction of both sides, the consequence of pleuritic attacks which had produced numerous adhesions between the lungs and costal pleura.*

However, if percussion taken singly frequently furnishes us

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the chest in the line of the clavicles; 3. around the middle of the chest, crossing the nipples anteriorily, and touching the inferior borders of the scapulæ behind; 4 around the lower part of the chest on the scyphoid cartilage.

By these imaginary lines the trunk is divided into three horizontal and eight vertical bands, and their intersections form, in all, sixteen compartments or regions, of which two are superior, four anterior, four lateral, (two on each side,) and six posterior. They are named as follows:—*superior regions*—humeral (right and left); *anterior regions*—subclavian (right and left), mammary (right and left); *lateral regions*—axillary (right and left), subaxillary or lateral (right and left); *posterior regions*—scapular (right and left), intra-scapular (right and left), subscapular or superior dorsal (right and left.)

There are few more useful exercises for the anatomical student than endeavouring to imprint on his mind some plan of this kind, and to teach himself by observation, and by multiplied experiment on the dead subject, the precise relations of the regions to the viscera that lie beneath them. He ought always to consider his knowledge as imperfect, until he is able to state, with considerable accuracy, the organs, or parts of organs, that will be wounded by a stiletto thrust in at any point. It is only after possessing such a degree of knowledge, that he can enter, with full advantage, upon the study of the various methods used in exploring diseases of the chest or abdomen, and that he can expect to derive from them the great practical benefits which they are calculated to supply.—*Transl.*

* There is an objection to percussion of another kind, which I do not remember to have seen mentioned by any one, but which it has occurred to me more than once to witness,—namely, the alarm produced in the minds of the patients upon their perceiving a great difference of sound in the two sides. In this respect, as in most others, mediate auscultation has a decided advantage; as, however ominous may be the results obtained by it, we can always conceal them from the patient.—*Transl.*

only with indications which are circumscribed and often doubtful, it becomes most valuable when combined with mediate auscultation; and we shall find hereafter that the pathognomonic signs of several important diseases, and among others of pneumothorax, emphysema of the lungs, and the accumulation of unsoftened tubercles in the upper lobes, are derived from the contemporaneous employment of these two methods.*

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* An important improvement on the method of percussion was recommended some time since by M. Piorry, and has been fully explained and illustrated in the following two valuable treatises published by him: *De la Percussion Mediate.* Par. 1828. 8. *Du Procédé Operatoire à suivre dans l'exploration des organes par la Percussion Mediate.* Par. 1830. 8. This improvement consists in interposing between the point of the fingers and the chest, a small plate of ivory on which the percussion is made; and from which circumstance the inventor has, in imitation of Laennec, given the name of *Mediate* Percussion to his method. The ivory plate (which has received the name of *Pleximeter* or *Plessimeter*, from the words πλήσσω, *I strike*, or πλῆξις, *percussion*, and μέτρον, *measure*,) is of a circular or ovoid shape, from an inch and a half to two inches in diameter, and about one-sixth of an inch in thickness. It has either a raised edge or rim, or projecting handles, on its upper side, to permit its being held between the finger and thumb of the left hand, while it is struck with the right. In making use of this instrument, all that seems essential is to apply it accurately, closely, and consequently parallel to the surface. As in simple percussion, the blow may be made with one or more fingers, and must be rapidly executed, with the points but not the *nails* of the fingers: on this account the nails must be kept short. The pleximeter may be applied immediately on the skin or over some portion of the clothes; and, as in the case of the stethoscope, it is necessary on some parts to interpose a small pledget of lint or soft linen, to insure its accurate apposition.

The following are the relative advantages and disadvantages of the two methods, as stated by M. Piorry. 1. Direct percussion is often painful, particularly in unskilful hands; as when the blows are too forcible, when they are applied upon the soft parts between the ribs, or when the nails are prominent: even, in some cases, the degree of impulse necessary to produce sufficient sound excites either a sense of pain on the skin, or a painful jarring within the chest, occasionally lasting some time. The use of the pleximeter enables us to avoid all these inconveniences; in the first place, because it defends the skin from the direct impulse of the fingers; secondly, because a less degree of impulse is necessary to produce the requisite sound; and, thirdly, because the shock is much less felt from being equally diffused over a considerable space. Even in the case of recent vesications, the interposition of the plate will frequently enable us to employ percussion with little or no inconvenience to the patient. 2. As the walls of the thorax consist of very different materials in different places, and vary likewise greatly as to their thickness, &c. direct percussion can only be effective when made on the more solid points of the thinner parts of the parietes; namely, the sternum, clavicles, ribs, and their cartilages: when made on the intercostal spaces, pectoral muscles, or mammæ, it is both painful and ineffective; and when there is a great accumulation of fat below the skin, or the parts are anasarcous or emphysematous, the sound is still more imperfect. Mediate percussion will enable us to get over most of these difficulties. By means of the interposed plate we can percuss equally on the bone and soft parts; and the precaution so requisite in direct percussion, to percuss on similar parts on both sides, becomes unnecessary, the plate constituting a sort of artificial solid wall to the soft parts. In the case of anasarca or emphysema, by compressing the distended parts with the plate, we obtain a solid point whereon to employ percussion, and thereby obtain results otherwise unattainable. 3. Mediate percussion is much easier, and requires much fewer precautions than the ancient method. In direct percussion we must never lose sight of the rule that the percussion must be made precisely in the same manner on the two opposite sides of the chest, to enable us to deduce safe conclusions from the resulting sounds: for instance, the blows must be made on similar structures, with the same degree of force, under the same angle, &c. With the pleximeter these precautions are much less necessary, because we have here always

CHAP. III.

OF IMMEDIATE AUSCULTATION.

HIPPOCRATES had made trial of immediate auscultation, as is proved by the following passage of the treatise *De Morbis;*

the same flat smooth surface whereon to strike, and an artificial wall every where of equal density and elasticity. Besides, less art is necessary in arranging the fingers in the latter case, a single finger being in general sufficient to elicit the necessary degree of sound.

In admitting the validity of these advantages of mediate over direct percussion, we must allow that the superiority of either in practice will depend greatly on experience. By one well versed in direct percussion, an instrument will not often be needed in the exploration of the chest, as his experience will enable him to evade most of the inconveniences attending the former. The necessity of carrying an instrument, however portable, will be felt by some to be an inconvenience; but this can never be admitted as a reason for rejecting the employment of a method which possesses decided advantages.

There is a variety of mediate percussion in common use still more simple than that of Piorry's, and which is well deserving the attention of the student. This consists of the substitution of one or two fingers of the left hand for the pleximeter, —the *back* of the fingers being uppermost. This proceeding possesses several of the advantages of M. Piorry's method; and it has even some few over it, exclusive of its greater simplicity. In cases where there is considerable emaciation, M. Piorry's method is liable to mislead, unless the intercostal spaces are carefully filled with some soft material; as, without this precaution, the sound may be modified by the hollow existing between the plate and the skin. Direct percussion on the ribs, or the employment of the fingers as a pleximeter, is often, in such cases, preferable. If we are careful in applying the fingers so as to make them fit accurately into the natural depressions, and thus form one body, as it were, with the thoracic parietes, —we are often enabled to use very forcible percussion without exciting pain, and also to elicit as definite sounds as by either of the other methods. This proceeding is free from another inconvenience which occasionally attaches to M. Piorry's method, especially in the hands of beginners. In the latter it sometimes happens that the loudness and sharpness of the primary sound arising from the contact of the two surfaces, are so considerable (particularly if the *nail* be used, which it ought never to be) as to drown, as it were, the secondary sound resulting from the modifying influence of the subjacent parts, from which modification it is that we form our judgment respecting the condition of those parts. When the fingers constitute the pleximeter, we have little or none of this immediate *clatter* when the blow is given.

In the percussion of the abdomen, possessed as it is of soft and yielding walls only, the pleximeter is absolutely necessary to the production of the requisite degree of sound; and it is yet further necessary, in many cases, in order to bring the superficial walls, by pressure, in contact with the subjacent parts. Mediate percussion alone may therefore be said to be applicable to the investigation of abdominal diseases. It is at least equally applicable with direct percussion to the chest; and as it has decided advantages in some cases, and no other disadvantage in any case than the necessity of having an additional instrument, it ought to take precedence of the original method of Avenbrugger in the investigation of pectoral diseases also.

An observation above stated by Laennec in the text, (p. 16,) that the indications from percussion conveyed *to the operator* are much stronger than to the by-standers, ought never to be overlooked in practice: the peculiar sensations indicative of the absence or presence of air in the subsequent parts, are often distinctly appreciable as communicated through the percussing fingers, when the difference of sound is imperceptible.

Different things have been used as *pleximeters*, and, among others, the horn cap

"You shall know by this that the chest contains water and not pus, if in applying the ear during a certain time on the side, you perceive a noise like that of boiling vinegar."* I need hardly state that the assertion, as far as the diagnosis is concerned, is erroneous. The sound heard by Hippocrates was probably that of simple respiration, or this intermixed with a crepitous rhonchus. It is very singular that this passage seems never to have engaged the attention of physicians, and there is no evidence that his experiment has ever been repeated, until the present time. It is true that I had myself read this passage of Hippocrates many years before I entertained the idea of mediate auscultation; but at the time I considered it, as it indeed is, one of the mistakes of that great man, and had altogether forgotten it. If Hippocrates had prosecuted this line of inquiry further, there is no doubt that he would have discovered many valuable truths, and might perhaps have arrived at mediate auscultation itself. But he seems to have proceeded no further than to announce the incorrect observation above quoted, and which his successors appear to have totally disregarded. This seems at first sight wonderful; and yet nothing is of more common occurrence: it is not given to any man to comprehend all the relations and all the consequences of the most simple fact; and we know that nature's secrets are more frequently betrayed by fortuitous circumstances than obtained by the force of our scientific efforts.

Since the publication of my researches, some physicians have attempted to repeat them by immediate auscultation; and there is one or two of these who seem to give this method the preference. Their chief reasons are—that it saves the trouble of carrying an instrument; that it enables us to perceive more sounds at once, and therefore more intelligibly; and that it is more easy to apply the ear than to keep the stethoscope in exact contact with the side.

These reasons are more specious than well founded. It is

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which is now commonly affixed to the auricular extremity of the stethoscope. M. Piorry objects to this on account of the liability of horn to warp, and also on account of the perforation in its centre. Dr. Williams, however, seems to consider this last as no objection, but recommends the inner surface of the cap to be lined with soft leather, to prevent the clacking noise produced by the impulsion of the fingers.—(*Rational Exposition*, p. 22.)—My own experience is against the use of the perforated pleximeter; exclusively of an objection I have to the cap of the stethoscope being so made as to be easily removed. In M. Piorry's Stethoscope, the ivory pleximeter is attached to its pectoral extremity, and indeed forms a necessary part of it. This arrangement is convenient, and is perfectly satisfactory as far as *percussion* is concerned; but I have already objected to the whole instrument regarded as a *stethoscope*. See Plate at the end.—*Transl.*

* Τούτῳ ἂν γνοίης, ὅτι οὐ πῦον, ἀλλὰ ὕδωρ ἐστι. καὶ ἢν πολλὸν χρόνον προσέχων τὸ οὖς ἀκουάζῃ πρὸς τὰ πλεῦρα ὄζει ἔσωθες οἷον ψόφος. De Morbis, II. § 59. Vanderlinden.

In the translation in the text I have followed the interpretation (the only reasonable one) adapted by Vanderlinden, Cornaro, and Mercurialis, as if it were ζέει (*fervet*) in place of ὄζει (*olet*).—*Author.*

true that the ear applied to the chest enables us to hear more sounds than we do by the stethoscope, particularly if the use of this instrument is not familiar to us. But this arises chiefly from this circumstance, that all the parts of the observer's head which bear upon the chest, namely, the cheek-bone, the temples and the angle of the jaw, become, severally, conductors of sound, and may thus convey the sound of respiration to the ear, although none exists immediately beneath it. This circumstance may lead to serious mistakes in cases where the pulmonary obstruction is partial and of small extent. To a person who has never tried either of the methods, it is no doubt an easier matter to apply the ear to the chest than to make use of the stethoscope; although the habit of using this instrument may be acquired in a very few days. But there exist innumerable reasons which will always render mediate auscultation a much surer guide and of much more extensive employment. I will here notice some of the principal of these:—

1. We cannot apply the ear to many points of the chest where important signs most frequently are found, such as the axilla, the region of the acromion, the angle formed by the clavicle and the head of the humerus, (in lean persons,) the lower end of the sternum when much depressed, and, frequently also, the interscapular region. In the case of females, exclusively of reasons of decorum, it is impracticable over the whole space occupied by the mammæ.

2. Immediate auscultation is more fatiguing to the patients than is the application of the stethoscope, inasmuch as this last bears only on one small point and needs hardly any pressure, while the due application of the naked ear requires a considerable pressure on the chest.

3. Owing to this circumstance, it gives rise to extraneous sounds from the contraction of the muscles, in keeping up the pressure, as we shall see afterwards: and the friction of the ear and head against the patient's clothes, produces much more sound than when the stethoscope is used. I have more than once had occasion to see physicians, or pupils, mistake these extraneous sounds for those of respiration. This mistake is more easy from the circumstance of the factitious sounds being, like those of respiration, subject to regular intermission from the natural motions of the chest.

4. The uneasy posture which one is frequently forced into, determines the blood to the head and renders the hearing dull. This circumstance, and the repugnance which every one must feel to apply the ear to a patient that is dirty or whose chest is bathed in perspiration, must always prevent the habitual or frequent use of this method; and this single circumstance takes from it three-fourths of its value; for, independently of the want of experience which must be the necessary result, we

thereby deprive ourselves of the very best and most practical advantage of auscultation, that, namely, of recognizing diseases at their commencement; since at this period they are almost always latent, and the discovery of them can therefore only be made by those who are accustomed to explore the respiration in all cases whatsoever.

5. Moreover, some of the most important of the stethoscopic signs have for one of their causes the stethoscope itself. Thus, perfect *pectoriloquy*, which consists in the transmission of the voice through the tube of the instrument, is changed, in the trial of immediate auscultation, into a simple resonance, stronger no doubt in the natural condition of the parts, but such as to be with difficulty discriminated from *ægophony* and *bronchophony*. For these and other reasons, I do not hesitate to affirm, that the physicians who shall confine themselves to immediate auscultation, will never acquire great certainty in diagnosis, and will every now and then fall into serious mistakes.*

CHAP. IV.

OF MEDIATE AUSCULTATION.

THE signs afforded by mediate auscultation in the diseases of the lungs and pleura, are derived from the changes presented by the sound of respiration, by that of the voice and coughing, within the chest, and also by the *rhonchus*, as well as certain other sounds which occasionally are heard in the same situation. Of these signs we shall now proceed to give some account. The notice of those which refer to the diseases of the heart, will be deferred until we come to treat of the affections of this organ.

The general precautions which the practice of auscultation requires are the following:—1. The stethoscope must be applied very exactly and perpendicularly to the surface on which it rests, so as to leave no interval between the skin and any part of the extremity applied.—2. We must be careful not to produce pain by too strong pressure; this precaution is most necessary when the instrument is used without the stopper, and when the person is lean.—3. Although it is not necessary that the chest should be uncovered,—as all the positive stethoscopic signs, and frequently also the negative ones, may be perceived through clothes of considerable thickness, provided they are applied closely to the body,—still it is better that the clothing should only be light; for example, a flannel waistcoat and shirt. Silks and also woollen stuffs are often inadmissible on account of the noise occasioned by their friction against the instrument. The examiner ought to be careful, above all things, not to place himself in an uncomfortable posture, nor yet to stoop too much, nor turn his head backwards by a forced extension of the neck. These positions determine the blood to the head and thus obscure the sense of hearing: they may sometimes be properly avoided by kneeling on one knee. In examining the fore parts of the chest we ought to place the patient on his back in a recumbent position, or in a chair, and gently reclining backwards. When we examine the back, we cause the patient to lean forwards and to keep his arms forcibly crossed in front; and when we examine the side, we cause him to lean gently to the opposite one and to place the fore arm on the head.

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* I entirely agree with the sentiment expressed by M. Meriadec Laennec, in his note on this passage, that the wise and peremptory reflections made by our author respecting the vast superiority of mediate over immediate auscultation, are unanswerable. The only instances in which I myself have found immediate auscultation *preferable*, have been in certain diseases of infants, who are sometimes too restless or too timid to allow the proper application of the instrument; while in the infinite majority of cases, it has been proved to be decidedly inferior for every purpose of practical value. To use the words of Dr. Williams, and at the same time to strengthen my testimony by the weight of his high authority, "I would express my conviction that although, with a view to expedition and convenience, immediate auscultation may be occasionally substituted, no one who has once thoroughly trained his ears to the use of the stethoscope, will ever so lightly esteem its aid as again to abandon it."—(*Cyc. of Pract. Med.*, vol. IV. Art. *Stethoscope.*)—*Transl.*

SECT. 1. *Auscultation of the respiration.*

In exploring the respiration we use the instrument without its stopper. In commencing our examination it is a proper precaution to cause the patient to take a few inspirations of moderate force and frequency, followed by expirations as nearly as may be of the same length. It sometimes happens that perfectly sound lungs give hardly any, or, at most, a very feeble respiratory sound; and in these cases it is commonly found that the sound is weak in proportion to the effort made by the patient to make it audible. At other times our patients fancying that something uncommon is expected from them, expand their chests to the very utmost extent; or they make several strong inspirations, one after another, without any intervening expiration; these unnatural efforts produce hardly any respiratory sound. In such cases, and indeed in all others where the sound of respiration is found to be weak, we desire the patient to cough. The act of coughing, particularly intentional coughing, is commonly preceded or followed by a real inspiration, which is then found to be as sonorous as the particular condition of the organ admits; and in these cases we are frequently surprised to perceive the ready penetration of the air into lungs which we should have considered as impermeable, if we had relied on our first trials. We sometimes obtain a similar end in making the patient speak, and still more, in making him read or recite.[*] I state this fact not only because it is of practical importance, but because it tends to the conclusion that the lungs are themselves possessed of an inherent power of action, the seat of which is probably in the smaller bronchial ramifications.

The sound of respiration is different in the lungs, the trachea, and the larger bronchial tubes, respectively. These differences we shall now describe.

1. *Vesicular respiration.*[†] On applying the cylinder, with its funnel-shaped cavity open, to the breast of a healthy person, we hear, during inspiration and expiration, a slight but extremely distinct murmur, answering to the entrance of the air into, and its expulsion from, the air-cells of the lungs. This murmur may be compared to that produced by a pair of bellows whose valve makes no noise, or, still better, to that emitted by a person in a deep and placid sleep, who makes now and then a profound inspiration.[‡] We perceive this sound almost equally distinct in every part of the chest, but more particularly, in those points where the lungs, in their dilatation, approach nearest to the thoracic parietes, for instance, the anterior-superior, the lateral, and the posterior-inferior regions. The hollow of the axilla, and the space between the clavicle and superior edge of the trapezius muscle, exhibit the phenomenon in its greatest intensity.

To judge correctly of the state of respiration by this method, we must not rely on the results of the first moments of examination. The sort of buzzing sensation often caused by the first application of the instrument, the fear, restraint, and agitation of the patient, which mechanically lessen the force of respiration, the frequently inconvenient posture of the observer, and the great sensation occasionally produced by the action of the heart,—are all causes which may at first prevent us from correctly appreciating, or even from hearing at all, the sound of inspiration and expiration. We must, therefore, allow some seconds to pass before we attempt to form an opinion. I need hardly observe, that there must be no noise whatever in the vicinity of the patient.

I have already mentioned the necessity of the observer avoiding uneasy postures. Beside the inconveniences stated, this may also mislead by occasioning the auscultator to hear the sound of the contraction of his own muscles. We must be equally on our guard that the patient does not excite this sound in his own muscles, by too strong a contraction of them in crossing the arms, leaning forward or resting on the elbow. On this account, in the examination of weak subjects, it is always better to have them supported by assistants, than to make them exhaust their remaining strength in keeping themselves in the erect position. It is right to observe, however, that all these precautions are only necessary to beginners. After one or two months' experience, the ear becomes accustomed to the sound it is in search of, and is able to discriminate it from all the others with which it may be combined, even when weaker than they are.

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[*] No doubt all these artificial modes of increasing the intensity of the respiratory sound are effectual, and are occasionally necessary; in the great majority of cases, however, a little patience is all that is wanted to lead to the most satisfactory result: after a minute or two of quiet exploration, the natural character of the respiration will generally be perceived.—*Transl.*

[†] I have ventured to substitute the term *vesicular respiration*, introduced by Andral, for that of *pulmonary* employed by our author, as being at once more precise, and contrasting better with the other varieties to be noticed below. In this I am supported by the authority of Dr. Meriadec Laennec, in his new edition of the Treatise.—*Transl.*

[‡] The student will most readily catch its true character, by applying the naked ear chest of a child.—*Transl.*

The intervention of clothing, even when of considerable thickness, provided it be of a compact texture and fit the body well, does not sensibly diminish the sound of respiration;* but we must be careful that there is no friction between this and the instrument, as this circumstance, especially if the clothes be of silk, or of fine, hard, woollen stuff, may mislead us by exciting a sensation analogous to that produced by respiration. Fatness, even when excessive, and anasarca of the chest, seem to have no effect in diminishing the peculiar sound. The sound is more distinct in proportion as the respiration is more frequent. A very deep inspiration made very slowly, will sometimes be scarcely audible, while an imperfect respiration—such, for instance, as hardly at all elevates the chest, provided it be made quickly,—may produce a very loud sound. On this account, when examining a patient, more especially if we have had but slight practice with the instrument, we should desire the respiration to be performed rather quickly. This is, however, a very unnecessary precaution in most diseases of the chest, as the frequent presence of dyspnœa necessarily renders the respiration quick. The same is true of fever, and the agitation caused by nervous affections.

Many other causes, and especially the age of the individual, alter the intensity of the sound. In children respiration is very sonorous, even noisy, and can be heard easily, even through very thick clothing. In them the close and forcible application of the instrument, to prevent the friction of the garments, is unnecessary, as any noise that might arise from this cause is lost in the intensity of the other. The respiration of children differs, also, from that of adults in other respects besides its intensity. It is impossible to describe this peculiarity, but it will easily be understood by comparative trials. It appears as if, in children, we could distinctly hear the dilatation of all the air-cells to their full extent: whilst, in adults, these seem as if, from their stiffness, they could only bear a partial dilatation. This difference of sound is much less marked in expiration than inspiration. The dilatation of the chest in inspiration is also greater in the child; and both these peculiarities are more remarkable as the child is younger: they continue, in a greater or less degree, to the period of puberty or a little beyond it.

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* This must not be taken too literally, except in the case of children, or when the respiration is morbidly strong. In adults, the intensity of the respiratory sound is certainly considerably lessened by thick clothing, even when there is no extraneous sound from friction; and in all cases it is better to have the body covered only with one, or, at most, two folds of linen or cotton cloth, (i. e. the shirt,) and not with flannel.—*Transl.*

The sound produced by respiration varies, also, very much in its intensity in different adults. In some men it is scarcely perceptible unless they make a very deep inspiration, and even then, although sufficiently distinct, it is not one-half so audible as in the majority of persons. These individuals have generally a rather slow respiration, and are little subject to dyspnœa, or breathlessness, from any cause. Others, however, have the respiration very distinct even during a common inspiration, without being, on this account, at all more subject to shortness of breath than the former. Some few individuals, again, preserve through life a state of respiration resembling that of children, and which I shall therefore denominate *puerile*, in whatever age it may be perceptible. Such persons are almost all women, or men of a nervous temperament, and they preserve, in some other respects, the character of childhood. Some of these cannot be said to have any actual disease of the lungs, but they soon get out of breath, even though lean, by exercise, and are very liable to catch cold. Others of this class are affected with a chronic catarrh, attended by dyspnœa, a condition constituting one of those cases to which the name of *Asthma* is usually given. With these exceptions, an adult cannot, by any effort, give to his respiration the sonorous character it has in childhood; but in some morbid states, the respiration spontaneously acquires it, without being, at the time, performed more forcibly than usual. This is particularly the case when one whole lung, or a considerable portion of both lungs, is rendered impermeable to air through disease, especially acute disease. In the sound portion of the lungs, in these cases, the respiration is perfectly similar to that of children. The same thing is observable throughout the whole extent of the lungs in some cases of fever, and in certain nervous diseases: [and also in cases in which tubercles are disseminated throughout lungs otherwise healthy; and in the earlier stages of diseases of the heart.] *

At first we are tempted to believe that the superior intensity of the respiratory murmur in children, may be owing to the tenuity of the muscles covering the chest, and to the superior suppleness of the texture of the lungs. But the first cause must have scarcely any effect in this way, since we find that, even in the fattest children, and in those most thickly clothed, the respiration is much more distinct than in the leanest adult examined uncovered; whilst of the adults who possess the *puerile* respiration, many are very robust and full of flesh. Neither does the quieter respiration of the adult depend on any induration or loss of pliability in the pulmonary texture, since it sometimes accidentally returns to the character it had in infancy. I am rather disposed to believe that the difference of result depends on the fact of children requiring a greater proportion of air, and consequently a fuller inspiration, than adults; whether this necessity arises from the greater activity of their circulation, or from some difference in the chemical composition of the blood. The respiration which is most audible to the ear, is not that which produces the greatest sound in the interior of the chest. I do not here allude to that species of respiration which is accompanied with a rattling or wheezing, or any other foreign sound, but to that kind of respiration which is simply loud, and which is so frequent in dyspnœa. This noise is merely the aggravation of the natural sound made by many persons in sleep, and is caused by the mode in which the air impinges upon the parts in the fauces. We can imitate it at will. I am acquainted with an asthmatic patient, whose habitual respiration can be heard at the distance of twenty feet, and whose respiration, as heard in the interior of the chest, is, nevertheless, weaker than in the majority of men. The same remark applies to the noise *(snoring)* emitted by many healthy persons during sleep; and, also, to the imitative sounds of jugglers and ventriloquists,—all of which are produced in the throat and posterior nares, and are quite unconnected with the sound of respiration in the interior of the chest.

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* The clause between brackets is supplied from a note of Dr. M. Laennec. Dr. Williams says, he has remarked the sound of respiration to be more distinct after meals.—(Rational Exp. p. 26.)—*Translation.*

When we can distinctly perceive, and with a uniform intensity, the respiratory sound in every part of the chest, we may be assured that there exists neither effusion into the cavity of the pleura, nor any species of obstruction in the substance of the lungs. On the other hand, when we find the respiration is not to be distinguished in any particular point, we may safely conclude that the corresponding portion of the lungs within, is become impermeable to the air from some cause or other. This sign is as easy to be perceived as the presence or absence of the sound, in the percussion of Avenbrugger, and affords precisely the same indications. With the exception of some peculiar cases, in which the simultaneous employment of the two different methods gives us signs which are completely pathognomonic—we may state it as a general fact, that the absence of the sound on percussion coincides uniformly with the absence of respiration, as ascertained by the stethoscope. Auscultation, as we shall find, has this advantage over percussion, that it points out more correctly the various degree of pulmonary obstruction. It has certainly the inconvenience of requiring a little more time in its application; but, on the other hand, it demands less care and attention, and moreover can be employed in all cases, even in those wherein percussion affords no results whatever.

2. *Bronchial respiration*. By this term I designate the sound of respiration as observed in the larynx, trachea, and larger bronchial trunks. When we apply the stethoscope upon the larynx or cervical portion of the trachea, we perceive that the respiratory sound is without that slight degree of crepitation which accompanies the dilatation of the air cells of the lungs: the idea of a *drier* sound seems to be suggested to us, and we at the same time feel distinctly that the air is passing through a large empty space. This modification of the respiratory sound may be perceived over the greater part of the neck: it is strongly marked on the side of the neck; and we must be on our guard against it when exploring the acromion region, insomuch that if we direct the extremity of the cylinder towards the lower portion of the neck, we run the risk of hearing the tracheal respiration only, and may thereby, if not well versed in the distinctive characters of the different kinds of respiration, be led to consider the upper lobes as quite sound, when they are in fact altogether impermeable to air. When a person inspires strongly by the nostrils, a like sound, originating in the nasal canal and fauces, may be heard over the whole surface of the head. In certain subjects, especially if very lean, the respiration possesses somewhat of this character when examined over the sternum and at the roots of the lungs, that is, between the scapulæ, and particularly near their upper and inner angle; but here the bronchial sound is not so readily distinguished, because of its intermixture with the common respiratory or vesicular murmur.* Still less are we able, in the healthy condition of the lungs, to distinguish this peculiar modification of the respiration in the smaller bronchial tubes, in other points of the chest. When, however, the texture of the lungs becomes indurated or condensed from any cause, such as pleuritic effusion, or the changes occasioned by a severe peripneumony or hæmoptysis, the vesicular respiration having then disappeared, or being much lessened, we can frequently perceive distinctly the bronchial respiration, not only in the large but even in the small ramifications of the bronchi. In such cases, although this peculiar modification of the respiratory sound is perceived in other parts, still it is nowhere so distinct as at the roots of the lungs. Next to the roots, the upper lobes exhibit it most frequently; and it is here, as we shall afterwards find, that the

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* Considered as a sign of disease, bronchial respiration is more valuable in proportion as it is perceived at a distance from the roots of the lungs.—(*M. L.*)

bronchi are most apt to become dilated. The cause of this bronchial respiration appears to me very obvious: in fact, when the air is prevented from penetrating the cells, this is the only kind of respiration that can exist; and it is found to be louder and more distinct in proportion as the lung is more condensed, and thereby becomes a better conductor of sound.

It is of great consequence to distinguish accurately the bronchial from the vesicular or pulmonary respiration,* not only on account of the great errors of diagnosis which must result from their being confounded, but because the former becomes a pathognomonic sign in several cases of importance. In peripneumony it is one of the first indications of hepatization, and commonly precedes the loss of the natural sound on percussion: it is likewise one of the earliest signs of an accumulation of tubercles in the upper lobes of the lungs.

3. *Cavernous respiration.* I understand by this term, the sound produced by inspiration and expiration in an excavation formed in the substance of the lungs, whether arising from the softening of a tubercle, from gangrene, from abscess, [or from extensive dilatation of the bronchi.] This variety has the same character as the preceding, only that it further conveys the idea of air entering into a larger cavity than a bronchial tube: and when there exists any doubt as to this being really the case, other circumstances connected with the sound of the voice and cough, remove all uncertainty.

4. *Blowing or puffing respiration.* In those cases wherein either the *bronchial* or *cavernous* respiration exists, it is sometimes observed that when the patient is breathing quickly and by fits, during inspiration the air appears as if drawn from the auscultator's ear, while in expiration it seems blown into it. This species of respiration is one of those phenomena which serve to confirm the existence of an excavation near the surface of the lungs,—but there are others yet more precise which will be noticed hereafter. This sort of puffing or blowing is equally produced during coughing and speaking. The illusion of blowing into the ear in these cases is so perfect, that it is only from the absence of the feeling of titillation, and of warmth or coldness, which a blast of air so impelled must necessarily occasion, that we are led to doubt its reality. This phenomenon is found to take place equally in the bronchi which adjoin the surface of the lungs, and particularly in the large branches at their roots, when the substance of the lung around is condensed, as in pneumonia, or by a pleuritic effusion. In the case of excavations, this variety of respiration always indicates that they are very close to the

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* This distinction is sufficiently easy in the adult, but much less so in infancy, on account of the intensity of the vesicular respiration. Still, the bronchial respiration may be recognized by its *tubular* character,—that is, its resemblance to the sound produced by blowing into a wooden or metallic tube.—(*M. L.*)

surface of the lungs. It sometimes also presents a further modification, which I call the *veiled puff* (*souffle voilé*). In this case, it seems to us as if every vibration of the voice, cough, or respiration, agitates a sort of moveable veil interposed between the excavation and the ear. This particular modification obtains under the following conditions:—1. in tuberculous excavations of which the walls are very thin, at least in some points, and which are unconnected by adhesions with the costal pleura; 2. in peripneumonic abscesses of which the walls are unequally indurated, and in some places only congested; 3. in cases of peripneumony, when some part of a large bronchial ramification passes through a portion of lung still sound or only slightly congested; 4. in dilatation of the bronchi, and also sometimes in pleurisy, when the affected branch has some part much less dense than the rest. We must be careful not to confound this phenomenon, with a variety of mucous rhonchus which sometimes accompanies it.

SECT. II. *Auscultation of the voice.*

In the very earliest period of my researches on mediate auscultation, I attempted to ascertain the differences which the sound of the voice within the chest might occasion. In examining several subjects with this view, I was struck with the discovery of a very singular phenomenon. In the case of a woman, affected with a slight bilious fever, and a recent cough having the character of a pulmonary catarrh, on applying the cylinder below the middle of the right clavicle, while she was speaking, her voice seemed to come directly from the chest, and to reach the ear through the central canal of the instrument. This peculiar phenomenon was confined to a space about an inch square, and was not discoverable in any other part of the chest. Being ignorant of the cause of this singularity, I examined, with the view to its elucidation, the greater number of the patients in the hospital, and I found it in about twenty. Almost all these were consumptive cases in an advanced stage of the disease. In some the existence of tubercles was still doubtful, though there was reason to suspect them. Two or three, like the woman above mentioned, had no symptom of this disease, and their robustness seemed to put all fears of it out of the question. Notwithstanding this I began immediately to suspect that this phenomenon might be occasioned by tuberculous excavations in the lungs. The observation of the same thing in patients who had no other symptoms of phthisis, did not appear to me conclusive against the correctness of my suspicions, because I knew it to be by no means unusual to find in the lungs of persons carried off by some acute disease, and who had never shown any sign of consumption, tubercles not only softened but excavated, and forming the very case denominated ulceration of the lungs. The subsequent death, in the hospital, of the greater number of the individuals who had exhibited this phenomenon, enabled me to ascertain the correctness of my supposition: in every case I found excavations in the lungs of various sizes, the consequence of the dissolution of tubercles, and all communicating with bronchial tubes of variable size.

I found this peculiar phenomenon (which I have denominated *Pectoriloquy*) to be more perceptible according to the density of the walls of the excavation and its proximity to the superfices of the lungs; and that it was most striking when these adhered to the pleura in such a manner as to render the thoracic parietes almost a part of the walls of the ulcerous excavation,—a case of very frequent occurrence.

This circumstance naturally led me to think, that *pectoriloquy* is occasioned by the superior vibration produced by the voice, in parts having a comparatively more solid and wider extent of surface than the air cells and small bronchial tubes; and I imagined that, if this were so, the same effect ought to result from the application of the cylinder to the larynx or trachea of a person in health. My conjecture proved correct. There is an almost perfect identity of effect between pectoriloquy and the sound of the voice as heard through the tube resting on the larynx; and this experiment offers an excellent means for giving us an exact notion of the phenomenon, when we have not the proper subjects for observation.

The sound of the voice in the different parts of the organs of respiration, and in the different conditions of these, in health and in disease, offers several important varieties which we shall now consider.* In a healthy lung it is very slight, whether examined by the naked ear or stethoscope, being only a slight vibration analogous to that felt on applying the hand. I have already noticed the character of the voice on the larynx and trachea: it resounds strongly, traverses the tube of the stethoscope, and prevents the unarmed ear from hearing that issuing from the mouth. The same thing takes place over nearly the whole lateral surface of the neck, and even, in some individuals, towards the nape. On this account, in examining the acromion region, we must remember the precautions stated when speaking of the exploration of the respiration in the same place. The natural resonance of the voice in the throat and nasal fossæ, is perceptible, more or less, over the whole surface of the head. In that portion of the trachea lying beneath the sternum, it sounds loudly but does not traverse the tube; on this account we must distrust *doubtful* pectoriloquy when it exists only about the upper portion of the sternum.

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Bronchophony. The sound of the voice is, in most cases, still more obscure in the larger bronchial trunks at the roots of the lungs, that is, in the interscapular region: nevertheless it is always somewhat louder in this place, especially about the upper and inner angle of the scapula, than in the other parts of the chest. It is indeed very rare for it to be perceived distinctly traversing the stethoscope, in a perfectly healthy subject; but it is found to resound so loudly at its extremity as to be more readily heard through the instrument, than the voice issuing from the mouth is heard by the other ear. In persons, however, of a delicate and feeble frame, particularly in lean children, there frequently exists in this situation, a *bronchophony* very similar to the *laryngophony* already noticed.

The sound of the voice is scarcely at all perceptible in the bronchi distributed through the lungs, when these organs are healthy. This might be expected *a priori*, since the loose texture of the lungs, rendered still more rare by its intermixture with air, is a bad conductor of sound; and the softness of the bronchial branches, after they cease to be cartilaginous, renders them very unfit for its production; while the smallness of their calibre must render whatever sound is produced more acute and weaker in them than in the larger trunks. But if any one of these adverse conditions is removed, and yet more, if several of them are so at the same time, the sound of the voice may become perceptible in the smaller bronchial tubes. Accordingly it is found that an attack of peripneumony, an extensive hemoptysical induration, or the accumulation of a great number of tubercles in the same point, by condensing the texture of the lungs, gives occasion to a sound analogous to pectoriloquy. This phenomenon, which I denominate *accidental bronchophony*, is, as might be expected, most marked when the pulmonary induration has place near the roots of the lungs. This sign is one of those which serve best to measure the progress of a recent peripneumony.

The dilatation of the bronchi gives rise to the same phenomenon, and the more readily, because the substance of the lungs in the neighbourhood of the dilated branches, is often more compact than in the natural state. Sometimes two of the causes mentioned conspire to produce it; for instance, the cause just mentioned, and the accumulation of tubercles.

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Bronchophony is rarely so like pectoriloquy as to deceive a person even of moderate experience. In the former, the voice merely traverses the cylinder; its tone is somewhat like that of a speaking trumpet; and the sound is more diffused in its seat than pectoriloquy. Where any doubt exists, this is removed by the cough and the character of the respiration in the same point: neither of these has the *cavernous* character: we feel assured that the whole phenomena have for their site a series of tubes, and not a circumscribed space.*

Pectoriloquy. This phenomenon may be produced under very different circumstances: 1. by the softening of tubercles (by far the most common cause); 2. by the decomposition of a gangrenous eschar; 3. by an abscess, the consequence of peripneumony; 4. by the evacuation of a cyst into the bronchi; and probably also by a fistulous communication between the bronchi and an abscess of the mediastinum.

Pectoriloquy offers great varieties, in respect of intensity and completeness. I divide it into *perfect*, *imperfect* or *doubtful*.

Pectoriloquy is *perfect* when the transmission of the voice through the stethoscope is complete, and when it, as well as the corresponding results obtained from the exploration of the cough and rhonchus, are exactly circumscribed: in this case it can never be confounded with bronchophony. It is *imperfect*, when some one of those characteristics is wanting, and particularly if the transmission of the voice be not evident. It is *doubtful*, when the sound of the voice is very feeble, and when it can be distinguished from bronchophony only by the aid of other signs derived from the consideration of its site, the general symptoms, and the progress of the disease. These last circumstances suffice, in almost every case, to enable us to distinguish the nature of the excavation.

The circumstances which concur to render pectoriloquy perfect are—the complete emptiness of the excavation, the increased density of the portion of lung which forms its walls, its ready communication with one or more bronchial tubes of a considerable size, and its proximity to the walls of the chest. It is proper to state, however, that whatever be the distance of the cavity from the surface of the lungs, if it possesses the other qualities indicated, it will always yield perfect pectoriloquy, unless, indeed, a very considerable thickness of healthy lung be interposed, which, owing to its defective density, is necessarily a bad conductor of sound. The extent of the excavation contributes also to the completeness of the phenomenon: it is most distinct when this is somewhat considerable; it is however often complete when the cavity is very small. On the other hand, pectoriloquy is sometimes very indistinct where the excavations are very large, the size of the fist, for instance, and when they communicate with the bronchi by small openings.* It has several times been manifest to me, that when the number of fistulous openings, by which a very large excavation communicates with the bronchia, increases, pectoriloquy becomes less evident, or ceases altogether. It disappears also in the two following cases: viz. when an excavation opens into the pleura, particularly if the opening is large and direct; and when its contents make their way through the walls of the chest into the cellular membrane outside. Pectoriloquy may likewise be sometimes suspended for several hours, and even days, by the temporary obstruction of the communication of the cavity with the bronchi, by the matter contained in it. We shall hereafter point out the method of obtaining pectoriloquy, or other equivalent signs, in cases of this kind.†

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* Bronchophony (that is, accidental or morbid bronchophony—*Tr.*) may exist in any point of the walls of the chest; but owing to the vicinity of the large bronchial trunks and to the greater frequency of hepatization of the pulmonary substance in the inferior lobes, it is found most frequently between the scapulæ and over the infra-spinous portion of these bones. It is also observed pretty frequently in the axilla and below the clavicles, in consequence of the greater prevalence of tubercles in the upper lobes.—(*M. L.*)

Ægophony. The phenomenon to which I have applied this name, is, of all those furnished by auscultation, that which seems to me most complex in its causes. It may readily be confounded, by the inexperienced, with pectoriloquy; and still more so with bronchophony. I was myself long guilty of this mistake; and although the distinction is easy when the respective characters of each are strongly marked, there occur cases in which this is hardly practicable. My uncertainty as to the nature of ægophony was of longer duration, because it does not exist in every case of pleurisy; because the analogous phenomenon of bronchophony is still more frequently wanting in peripneumony; because these two diseases and consequently the two phenomena in question are frequently combined; and, finally, because the number of fatal cases of these diseases, more particularly of acute pleurisy, is too inconsiderable to afford many opportunities of verifying, by examination after death, the accuracy of the diagnosis derived from auscultation.‡

Simple ægophony consists in a peculiar sound of the voice which accompanies or follows the articulation of words: it seems as if a kind of silvery voice, of a sharper and shriller tone than that of the patient, was vibrating on the surface of the lungs, sounding more like the echo of the voice than the voice itself. It rarely appears to enter the tube of the instrument, and scarcely ever passes through it entirely. It has, moreover, another character, so constant as to lead me to derive from it the appellation of the phenomenon,—I mean a trembling or bleating sound like the voice of a goat, a character which is the more striking because the key or tone of it approaches that of this animal's voice.* When ægophony exists in the vicinity of a large bronchial trunk, particularly towards the root of the lungs, it is frequently combined with more or less of bronchophony. The reunion of these affords numerous varieties, of which we may have a good idea by recollecting the following phenomena: 1. the sound of the voice through a metallic speaking trumpet or cleft reed; 2. that of a person speaking with a counter between his lips and teeth; 3. the nasal intonations of the juggler speaking in the character of Punch. This last comparison is frequently the most exact imaginable, particularly in persons whose voice is somewhat bass (grave). Very commonly, the same individuals who exhibit at the roots of the lungs, this combination of the two phenomena, yield simple ægophony, about the outer and lower edge of the scapula.

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* This fact may be explained on the principles of acoustics, and by a reference to certain musical instruments.—*Author.*

† Pectoriloquy may be observed on any part of the thorax, as morbid excavations may occur in any part of the lungs; but as these excavations are most commonly produced by the evacuation of the matter of tubercles, and as tubercles are principally developed in the upper lobes, it is below the clavicles and in the axilla that we ought to expect to meet with it most frequently.—(*M. L.*)

‡ This assertion may seem strange to the practitioners who employ only bleeding and blisters in those diseases, but will be confirmed by the young physicians and students who have attended my *Clinique* since I have been in the habit of using Tartar Emetic in large doses.—*Author.*

The sort of bleating so characteristic of ægophony seems, in most cases, immediately connected with the articulation of the words, although the patient's true voice has nothing of the sort: sometimes, however, it seems unconnected with the articulation, so that we can hear, at the same time, yet separately, the simple sound of the voice and the bleating silvery sound of ægophony; which last appears to be either nearer or more remote than the resonance of the simple voice. Sometimes, even, when the patient speaks slowly and interruptedly, we hear the bleating, like an imperfect echo, immediately after the voice. These two last-named varieties have appeared to me to exist only in cases of slight effusion. To hear this sound properly, we must apply the cylinder strongly to the patient's chest, and place the ear gently on the other end. If the latter is forcibly applied, the bleating sound is diminished one half, and the phenomenon approaches nearer to bronchophony.

In comparing the results of my early and more recent experience respecting ægophony, it seems to me certain that it exists only in cases of pleurisy, either acute or chronic, attended by a moderate effusion in the pleura, or in hydrothorax or other liquid extravasation in the same cavity.

All the cases in which I have observed ægophony, since I have been able to discriminate it from pectoriloquy and bronchophony, have, at the same time, afforded other undoubted signs of effusion into the chest. In the examples of pleurisy which I have been able to attend to from their commencement to their close, I found it as early as the first hours of the attack; but it has never been observed strongly marked until the second, third, or fourth day, and hardly ever until after the sound of respiration has become almost or altogether imperceptible in the affected side, and until this has yielded the dull sound on percussion. I have observed ægophony in every case of pleurisy which has come under my care during the last five years, except in a few very slight acute cases, where the effusion (as proved by the auscultation of the respiration and by percussion) was inconsiderable, and in those which did not come under my notice until far advanced and when they were in progress towards recovery. I have discovered this sign in cases where there did not exist above three or four ounces of fluid in the chest. Ægophony decreases and gradually disappears as the effusion is absorbed. In very acute cases, it exists frequently two or three days only, and then totally disappears: in the chronic state of the disease with moderate effusion, I have found it sometimes continue for several months, with variations of intensity proportioned to the varying quantity of the effused fluid. When this is very great, particularly when it is sufficient to cause dilatation of the chest, ægophony ceases entirely. I have never observed it in old cases of empyema in which the lungs were compressed upon the mediastinum; but have detected it, in an imperfect degree, in certain cases where the pleura contained from two to three pints of pus, and where the lungs were prevented from being quite removed from the side by previous adhesions. On the other hand, I have found that those cases, which, when first seen, presented all the other signs of copious effusion except ægophony, yielded this sign also when the dilatation of the side diminished, and the other symptoms indicated the partial absorption of the fluid. In two cases of empyema operated on by my direction in 1821 and 1822, ægophony became much more manifest after the escape of a portion of the pus.

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* The word *Ægophony* is derived from αἰξ (αἰγος) *a goat*, and φωνη, voice. In exploring the chest for it, the stethoscope is to be used as directed in the note on Pectoriloquy, p. 36.—*Transl.*

Ægophony is not like pectoriloquy, confined to one point, but extends over a certain continuous portion of the chest. Most frequently it exists, at the same time, over the whole space between the scapula and spine, round the lower angle of the former bone, and in a zone from one to three fingers broad, following the line of the ribs from its middle to the nipple. This portion of the chest evidently corresponds with the internal parts where the effused fluid forms a thin layer on the surface of the lungs; it being well known that, in cases of moderate extravasation, the fluid collects principally in the lower part of the chest, when the patient is seated or resting on the back; and that, even in the cases where the whole surface of the lung is covered by it, the thickness of the layer progressively diminishes from below upwards, and is always much less before than behind. In a very few instances I have detected ægophony, at the commencement of the disease, over the whole affected side; in two of these I ascertained, by examination after death, that this peculiarity depended upon the retention of the lung in partial apposition with the chest, by means of pretty numerous adhesions, so that the lung became invested by a thin layer of fluid over its whole surface. In cases of this kind the sign in question is observable during the whole period of the disease.

I consider ægophony to be owing to the natural resonance of the voice in the bronchial tubes, rendered more distinct by the compression of the pulmonary texture, and by its transmission through a thin layer of fluid in a state of vibration. This opinion is supported by many facts and reasons. The points where it is constantly found, correspond with the upper border of the fluid, and where it is of least thickness. Moreover, if the patient turns on his face, the sound either disappears or is greatly diminished between the scapula and spine, while it continues on the side; and if he turns on the healthy side, the same result is obtained in the diseased side, now the uppermost.[*] In respect of the influence of change of position upon this phenomenon, I have observed that the change was much less in cases where the quantity of fluid was either somewhat above or below the mean, than when it was of middling extent. The places formerly mentioned as yielding most distinct ægophony, are those where the bronchial tubes are the largest and most numerous. This tends to confirm the truth of the opinion above stated, as well as the fact of the cessation of the sign when the effusion becomes very copious, and its return on this being diminished: in the former case, it is evident that the bronchi, as well as the lungs, must be compressed, while in the latter, they must be the first to recover their natural shape on account of their superior elasticity. The following circumstance, which I have now and then observed, leads to the same conclusion. In cases where ægophony was very strongly marked in the zone formerly mentioned, and where auscultation of the respiration, percussion, and the general symptoms clearly indicated an effusion, I have remarked from day to day the following changes take place in respect of this sign, and precisely at the same moment that the other signs just enumerated gave evidence of the progressive absorption of the fluid: it had become less loud every where;—it had lost three inches in extent, reckoning from above downwards, in the interscapular region, and one inch on the side, and had entirely disappeared in front; while, on the other hand, it had become very distinct, though not loud, over the whole inferior parts of the side and back, where it did not exist at all on the preceding day. These changes, I think, indicated the recession of the fluid from the upper parts, and its diminution in the lower. In fact, I am of opinion, that this phenomenon only exists when the lung is envoloped with a thin layer of fluid; and that in the instances just mentioned it became perceptible on the lower parts of the chest, only because the quantity of this had diminished. This opinion is further rendered probable by the fact of the respiration being always very distinct in the places where ægophony exists, while it is not observed at all or very feebly below these places; and, by the additional observation, that when the ægophony descends, as above mentioned, the respiration becomes stronger in the points which it leaves, and re-appears in those which it now occupies. I have already stated, that in cases of very copious effusion, there is usually no ægophony, or if it exists at all, it is only near the roots of the lungs, a situation where the fluid is necessarily less than any where else.

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[*] M. Reynaud, one of Laennec's most zealous disciples, has ascertained, that if an ægophonous patient lies on his belly, or leans forward so as to bring the body into an almost horizontal position, not only does the ægophony disappear from the interscapular region, but is replaced by a bronchophony of a greater or less intensity according as the lung is sound or in a state of inflammation. In the latter case, as the ægophony vanishes, the crepitous rhonchus, or the bronchial respiration, reappears. From this, M. Reynaud infers, that ægophony is merely a *remote bronchophony*, that is to say, a bronchophony heard through a layer of fluid of greater or less thickness. (Journ. hebdom. de Med. Dec. 1829.) It is, however, of little consequence what may be the actual nature of ægophony, provided it be ascertained that it depends on an anatomical condition of parts different from that which gives occasion to bronchophony properly so called. And M. Reynaud's observation establishes this fact beyond all question, and, moreover, supplies us with the means of distinguishing, in every case, ægophony from simple bronchophony, and consequently pleurisy or pleuro-pneumonia from simple pneumonia.—(*M. L.*)

It will be difficult to fix more precisely than I have now endeavoured to do, the exact relation between the bronchi and the thoracic effusion, which gives rise to ægophony. This will be the more difficult on account of the small number of cases that prove fatal during the existence of this phenomenon. When death occurs from pleurisy the effusion is generally very abundant, and ægophony has therefore disappeared. In looking for assistance from morbid anatomy, in this instance, we are, therefore, reduced to the very small number of cases that prove fatal from some concomitant disease, at the very time when the patients happened to be affected with pleurisy in that stage wherein ægophony exists.

I made an experiment with the view to ascertain the effect of an interposed fluid in modifying the voice to the character it possesses in ægophony, by applying a bladder, half filled with water, between the scapul of a young man who presented a well-marked natural bronchophony in this point. In this case, it appeared to myself and several persons present, that the voice, as transmitted through the liquid, became more acute, and also slightly tremulous, although less decidedly so than in real ægophony. The same experiment tried over the larynx gives a similar result.

It seems probable that the compression of the bronchial tubes by the pleuritic effusion contributes a good deal to the production of this phenomenon; since this must bring them into a form analogous to the *reeds* of certain wind instruments, such as the oboe and bassoon, which have something of the *bleating* sound of ægophony. This alteration of form, however, will not of itself account for the phenomenon, without the presence of fluid, else it would exist in cases of contraction of the chest subsequent to pleurisy, which is not the fact. It would also be found in many cases of phthisis, wherein tubercles frequently compress the bronchi in the most decided manner.*

I think there are only three cases of pleurisy in which this phenomenon will not be observed: these are,—1. where a very rapid and copious effusion has suddenly compressed the lung against the mediastinum;—2. where a former attack of the same disease has firmly attached the posterior parts of the lung to the pleura; and 3. where there is hardly any liquid extravasation, but the formation, simply, of false membranes. This last case is very rare; and besides I have found ægophony where not more than two or three ounces of fluid existed.

From the preceding observations, I think we are entitled to conclude that ægophony is a favourable sign in pleurisy, as it seems uniformly to indicate a moderate degree of effusion. Its continuance for some time is a favourable omen, as showing that the effusion does not increase; if it continues as long as the fever, or longer, we may be assured that the disease will not become chronic, as this never happens except when the effusion is extremely abundant. I have frequently drawn this prognostic, and have never been deceived in it. In every case where I have seen acute pleurisy terminate in chronic, this phenomenon has ceased, or been much lessened, previously to the decrease of the febrile symptoms.

Ægophony, like pectoriloquy, is sometimes suspended for a longer or shorter time, re-appearing after the patient has coughed or expectorated. But this happens much less frequently in the case of the former, as might be expected from the comparatively small bronchial secretion in pleurisy.

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* Dr. Williams says, that this additional explanation of the cause of ægophony is not only unnecessary, but untenable. "The reed of the bassoon and hautboy," he observes, "sounds only on the passage of *air* through it, and did the flattened bronchi represent it in this instance, the respiration, and not the voice, should make the sound." In accordance with the previous explanation of our author, Dr. W. says, "the tremulous or subsultory sound of the ægophonic voice is produced by successive undulations of the liquid, the result of an irregular transmission of the sonorous vibrations." The same author says, that in addition to the preceding requisites, there must likewise exist a certain proportion between the mass of liquid and the pitch and strength of the vocal sounds, otherwise the fluid will not be thrown into vibration. This, he says, is proved by the fact, that certain tones of the same voice are ægophonic, and others not.—*Rat. Expos.* p. 107. 8.—*Transl.*

Some physicians have lately fancied that they have met with ægophony in cases of simple peripneumony without any pleuritic effusion; but I have no doubt they mistook bronchophony for it. It must be admitted that the two phenomena are likely to be confounded; I shall, therefore, in this place, compare them with each other, as well as with pectoriloquy. 1. Pectoriloquy being, in the great majority of cases, owing to the presence of tuberculous excavations, is almost always met with in the upper lobes. In whatsoever part, however, it may exist, it will always be readily distinguished by the accompanying cavernous rhonchus, respiration and cough. In certain rare instances, namely, where the excavation is of a flattened shape with rather solid walls, pectoriloquy may assume something of the vibratory character of ægophony; but it will almost always be distinguished from it, by the exact circumscription of the sound to a small space, by its situation, and by the consideration of the accompanying phenomena. 2. Bronchophony being caused by the simple induration of the substance of the lungs, does not yield the clear transmission of the voice through the tube, except at the roots of the lungs. The sphere of this phenomenon is always over a certain extent, and no one small point can be said to be its exclusive site. The same is true of the respiration and cough; the former is frequently found to be *bronchial*, and the latter to give the *mucous rhonchus*, but they are diffused over a certain space, and not, like those which are observed in cases of pectoriloquy, confined within a circumscribed spot. Bronchophony is less readily suspended than pectoriloquy, but more frequently than ægophony, for obvious reasons depending on the relative condition of the bronchial secretion in the diseases in which each especially occurs. Finally, the tone or key of the speaking trumpet completes the list of the distinctive characters of bronchophony. 3. True and simple ægophony is characterised by the harsh tremulous silvery tones of the voice, which is commonly more acute than the natural voice of the patient, and seems to be quite superficial, and to float, as it were, on the surface of the lungs, instead of coming from the interior, like pectoriloquy and bronchophony. It seems, moreover, to be rather the echo of the voice, repeating the words or their final syllables, in a small sharp and tremulous key, than the voice itself. This character of ægophony is especially marked when it exists in the anterior and lateral parts of the chest; since between the scapulæ and at their lower edge (to which situation, by the way, it is most commonly restricted) it is almost always conjoined with the natural bronchophony, rendered stronger by the compression of the lungs in that part. And it is here, in the space between the inner edge of the scapula and the spine, and in this part only, that we occasionally perceive the bleating, ægophonic voice completely traversing the tube, with the most perfect resemblance of the squeaking of Punch. Ægophony and bronchophony are necessarily conjoined in cases of pleuro-peripneumony; and, indeed, pectoriloquy may co-exist with them, when an abscess of the lung supervenes.

When I published the first edition of this work, I was not quite sure that ægophony might not exist in simple peripneumony: farther experience, however, has completely convinced me that this cannot be the case. Whatever analogy there may be between this phenomenon and bronchophony, it is easy to distinguish them, when they exist separately; and an experienced ear may recognise them, in most cases, when they co-exist in pleuro-peripneumony. Certain cases, however, will always be doubtful; and when it is so, we must be contented with the portion that is certain. The following positions seemed proved: 1. that ægophony exists in simple pleurisy, and in no case with more decided characters: 2. that bronchophony exists frequently in peripneumony, and with features sufficiently well marked to distinguish it from ægophony; 3. that both these co-exist in certain cases of pleuro-peripneumony.

When we meet with cases, where the results obtained from percussion and the auscultation of the respiration leave reason to doubt as to the existence of pleurisy or peripneumony, if we find ægophony very complete and little mixed with bronchophony, we may conclude that the disease is exclusively the former, or nearly so; and, on the other hand, if the bronchophony is strongly marked, and with merely a shade of the stuttering cracked note of ægophony, we may decide upon peripneumony being the chief disease, conjoined, probably, with a slight pleuritic effusion. We may even conclude against the existence of any effusion, if the characteristics of ægophony are observed only at the inner border of the scapula.[*]

I have dwelt the longer upon these distinctions, because they form perhaps the most difficult point in auscultation, and particularly because ægophony is the only one among the stethoscopic signs, whose value has been called in question[†] by competent judges. Cases of simple peripneumony, in which ægophony was supposed to exist, have been communicated to me by several of my colleagues, and by many pupils. All these, as far as I had the means of ascertaining, were examples of bronchophony mistaken for ægophony, or a mixture of the two. In like manner I am constantly meeting with cases in the hospital, where the two phenomena are confounded by the pupils;—but when I have pointed out the distinction between them, and they have acquired more experience, they hesitate only in cases which are really doubtful.

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[*] All these diagnostic signs will be much more certain if we examine the patient in different positions. Decubitus on the abdomen will, in particular, enable us to distinguish simple ægophony from simple bronchophony, or from bronchophony conjoined with ægophony. (See note, p. 42.) (*M. L.*)

[†] A curious misprint exists in this passage, in the new edition of the original, viz.—of *constutée* for *contestée*, whereby the author is made to assert directly the reverse of what he intends.—*Transl.*

SECT. III. *Auscultation of the Cough.*

Coughing in a healthy state of the lungs excites no particular sound within the chest. When we listen with the cylinder on the larynx or trachea, and at the roots of the lungs where the chest is narrow, besides the shock communicated by the act of coughing, we hear, at the same time, a sound as of the transmission of air in a tube. When the lungs are inflamed to the degree of hepatization, this peculiar sound becomes more manifest, at the root of the lungs, and even in the bronchial tubes not larger than a goose-quill, than it is in the trachea in a state of health; I therefore shall designate it *tubary cough.** This cough is found also in cases of pleurisy, but at the roots of the lungs only. It exists equally in cases of dilatation of the bronchi, and may serve as a test of the degree of dilatation. Where there exists an excavation in the lungs communicating with the bronchi, the cough resounds in it as it does in the larynx, but is confined to a small space: it also gives rise to the *cavernous rhonchus*, and more readily than simple respiration does, particularly if there is still much matter contained in it, and not in a very liquid state. If the excavation is empty, this emptiness is indicated by the *cavernous cough*, better than any other phenomenon. Coughing gives also, in certain cases, the *metallic tinkling*, when it is not perceptible by the respiration or voice. When pectoriloquy is suspended in a tuberculous excavation, from obstruction of the bronchi by the sputa, coughing restores it by the expulsion of these, or excites the cavernous rhonchus, which is of the same import as a diagnostic sign: it clears, in like manner, the fistulous communications between the pleura and bronchi. In the excavations, where the tuberculous matter has only begun to be softened, and in the incipient abscess of peripneumony, while simple respiration is still unable to excite any rhonchus, coughing will often give a very strong guggling. And it may be stated as a general truth, that all the sounds to be described in the next Section, are more audible during the act of coughing than during simple respiration. However, in deducing our indications from the auscultation of the cough, certain precautions are necessary. Sometimes a violent cough seems rather to close than open the pulmonary channels, producing a great commotion of the lungs and walls of the thorax without giving rise to any guggling. At other times, in timid patients, the cough seems confined to the throat, and excites no resonance in the bronchi.* One of the cases where this intentional cough is most useful, is in that variety of the dry catarrh, wherein the respiratory sound is inaudible under ordinary circumstances. Here the act of coughing, which, as we have formerly observed, is always either preceded or followed by a powerful inspiration, enables us to hear the sound of respiration, and thereby to judge of the condition of the lungs. The same measure is equally valuable in incipient peripneumony, especially if grafted on a chronic dry catarrh. In this case, percussion elicits a sound which is either doubtful or delusive, and common respiration is inaudible; but the cough restores the respiratory murmur, whenever the lungs are permeable, and enables us to detect the crepitous rhonchus, the pathognomonic sign of incipient peripneumony.

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* I consider the term *bronchial cough* employed by Andral (Dict. de Med. Prat. t. iii. p. 662) decidedly preferable to that in the text.—*Transl.*

It is proper to observe, that we ought not to have recourse to the factitious cough, as a means of exploration, except where simple respiration is insufficient, as it may fatigue our patients. At the same time I may add, that its inconveniences, in this respect, are less than may be imagined; as one single cough, and that rather moderate than otherwise, is sufficient to afford to an experienced observer all the signs which this phenomenon is capable of yielding.

SECT. IV. *Auscultation of sounds not necessarily accompanying the respiration and voice.*

Various sounds, foreign to the natural respiratory murmur or resonance of the voice, may arise within the chest from various accidental causes: I shall class these under two heads—*the rhonchus* and *metallic tinkling*.

I. *Of the different kinds of rhonchus.*

For want of a better or more generic term I use the word *rhonchus*† to express all the sounds, besides those of health, which the act of respiration gives rise to, from the passage of the air through fluids in the bronchi or lungs, or by its transmission through any of the air passages partially contracted. These sounds likewise accompany the cough, and are made even more perceptible by it; but in most cases, the auscultation of the respiration suffices for their exploration. They are extremely various; and although they possess, in general, very striking characters, it becomes difficult so to describe them as to convey any thing like a correct notion to those who have never heard them. Sensations, we know, can only be communicated to others by comparisons; and although those which I shall employ may seem to myself sufficiently exact, they may not be so to others. I expect, however, that my description will enable any observer, of ordinary application, to recognise them when he meets with them, as they are much more easily distinguished than described.

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* In this latter case we desire the patient to cough after taking a deep inspiration. *Author.*

† It is very desirable that some name might be found for this phenomenon which would prove generally acceptable to British physicians. In the former edition of this translation, the nearest English synonyme, *rattle*, was used, but this word has been adopted by few. The original French term *râle* appears to be most generally employed in this country; but there are several objections to its use. In the present work I shall give the preference to the Latin synonyme, *rhonchus*, also employed by Laennec, and sanctioned by the adoption of Dr. Williams and Dr. Copland.—*Tr.*

We can distinguish five principal kinds of rhonchi: 1. the moist crepitous rhonchus, or *crepitation;* 2. the mucous rhonchus, or *guggling*; 3. the dry sonorous rhonchus, or *snoring;* 4. the dry sibilous rhonchus, or *whistling;* 5. the dry crepitous rhonchus, with large bubbles, or *crackling.*[*]

1. *The moist crepitous rhonchus*[†] has evidently its site in the substance of the lungs. It resembles the sound produced by the crepitation of salts in a vessel exposed to a gentle heat, or that produced by blowing into a dried bladder, or it is still more like

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[*] The different kinds of rhonchi have their site either in the air cells, or bronchial tubes, or in some morbid excavations formed in the substance of the lungs; and they are caused either by some substance within these, more or less fluid, and moving in contact with air, or by some other obstruction in the air passages from external compression or alteration of their coats. A consideration of these different causes, and of the sounds, resulting from them, seems to point out a very convenient mode of arranging them as follows:—1. Rhonchi having their site in the vesicles or air cells —*vesicular rhonchi*; 2. rhonchi having their site in the bronchial tubes—*bronchial rhonchi*; 3. rhonchi having their site in morbid excavations—*cavernous rhonchi*. All the causes of these sounds may be divided into two kinds, according as they are dependent on the presence of a liquid, or on some change in the coats or caliber of the air passages, or on obstruction from matter of a solid kind. The different kinds of rhonchi may therefore be termed either humid or dry. We shall thus have our classification as follows:—

I.—*Vesicular rhonchi.*

1. Humid vesicular rhonchus—Moist crepitous rhonchus—Râle crepitant of Laennec.

2. Dry vesicular rhonchus—Dry crepitous rhonchus—Râle crepitant sec à grosses bulles, ou craquement of Laennec.

II.—*Bronchial rhonchi.*

1. Humid bronchial rhonchus—Mucous rhonchus—Râle muqueux of Laennec.

2. Dry bronchial rhonchus. *a.* Sibilous rhonchus--Râle sibilant sec of Laennec, *b.* Sonorous rhonchus Râle sonore sec of Laennec.

III.—*Cavernous rhonchi.*

1. Humid cavernous rhonchus—Cavernous rhonchus—Gargouillement, Râle caverneux of Laennec.

2. Dry cavernous rhonchus. This species is added more on account of uniformity, and because it is possible, than because such a variety has been described.

[†] Humid vesicular rhonchus.—*Transl.*

that emitted by the healthy lungs when distended by air and compressed in the hand,—only stronger.[*] Besides the sound of crepitation, a sensation of humidity in the part is clearly conveyed. We feel that the pulmonary cells contain a watery fluid as well as air, and that the intermixture of the two fluids produces bubbles of extreme minuteness.

This species of rhonchus is one of the most important, and fortunately it is most easily distinguished; a single observation being sufficient to mark it ever after. It is the pathognomonic sign of the first stage of peripneumony, disappearing on the supervention of hepatization, and re-appearing with the resolution of the inflammation. It is found also in œdema of the lungs, and sometimes in pulmonary apoplexy, but in these two cases, *the bubbles* usually seem to be somewhat larger and moister than in the rhonchus of peripneumony. This variety I call *subcrepitous.*[†]

2. *The mucous rhonchus.*[‡] This is produced by the passage of the air through sputa accumulated in the bronchi, or through the softened matter of tubercles yet undischarged. It presents many varieties of character, which can hardly be defined, and of which indeed we can only form any notion, by comparing the perceptions derived from the sense of hearing, with such as we fancy might be conveyed by the sense of sight. In listening to it, we receive the impression or idea of bubbles, such as are produced by blowing through a pipe into soapy water. The ear seems to appreciate most distinctly the consistence of the fluid which forms the bubbles, and also their varying sizes. The consistence of the fluid appears always greater in the mucous than in the crepitous rhonchus.

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[*] This variety of rhonchus is compared by Andral to the sound produced in rubbing a piece of parchment; by Dr. Williams to the sound produced in rubbing between the finger and thumb a lock of hair, close to the ear. Other comparisons have been adduced, such as the noise of boiling butter, that occasioned by the bursting of the minute bubbles on the surface of beer or soda water, &c. Of these the comparison of Dr. Williams comes nearest the natural sound. Perhaps as just a notion of it may be conveyed to the mind by imagining the quality of *roughness* superadded to the pure or smooth sound of healthy respiration.—*Trans.*

[†] M. Cruveilhier calls in question the propriety of considering the crepitous rhonchus as a sign of pneumonia, œdema of the lungs or pulmonary apoplexy, pretending that it may be wanting in these diseases, and be present in others of a different kind. (Revue Med. Fev. 1830.) It seems probable, from this, that M. Cruveilhier is unable to distinguish the true crepitous rhonchus from the obscure mucous rhonchus.—(*M. L*)

There is reason in M. Cruveilhier's objection, since the crepitous rhonchus is certainly occasionally perceptible in bronchitis, and, according to Dr. Stokes, (Irish Trans. vol. v. p. 326,) in the early stage of phthisis.

In a late work on Auscultation, by Mr. Spittal, (a Treatise on Auscultation, by Robert Spittal, Edin., 1830,) some account is given of the sounds produced by the bursting of bubbles on the surface of different fluids when agitated. He found that fluids of the density and tenacity of serum gave rise to sounds most nearly resembling those of the moist crepitous rhonchus; and M. Piorry states, that the very same sound is produced in the dead body by injecting fluids into the lungs. (Du Procédé Operatorne, pp. 81, 94.)—*Trans.*

[‡] Humid bronchial rhonchus.—*Trans.*

In respect of the size of the bubbles in the different rhonchi, they may be estimated as *very large*, *large*, *middling*, *small*. The last term is especially applicable to the crepitous rhonchus of peripneumony, in which it seems as if an infinity of minute equal-sized bubbles, formed at once, were thrilling or vibrating, rather than boiling, on the surface of a fluid. The mucous rhonchus, on the contrary, appears always larger, and most usually unequal, so as to convey the idea of a liquid into which some one is blowing, and thereby producing bubbles, of which some are of the size of a filbert, and others only as large as a cherry-stone or hempseed. We can estimate the quantity as well as the size of the bubbles, and may thus designate the rhonchus as *abundant*, or *rare*. Accordingly, it sometimes seems that the point of lung beneath the stethoscope, is filled with bubbles that touch each other; and at other times, there seems to be only one here and there, while the intervening portion of lung yields the simple sound of respiration, or yields no sound at all, as the case may be. When the mucous rhonchus is very large and infrequent, we can distinctly perceive the bubbles form and burst. When it exists at once copious, large, and constant, it is sometimes so noisy as to resemble the rolling of a drum.

A variety of the mucous, is the *tracheal rhonchus*. It is observed, when there is accumulated much mucous or other sputa in the larynx, trachea, or larger bronchial tubes, and may be readily heard by the unassisted ear; as in the case of the *dead-rattles* of the vulgar, from which I have derived the general appellation of the phenomenon. This species, or rather variety, may exist without there being any other perceived in the bronchi by the stethoscope; but the reverse of this is much more common, namely, that the instrument conveys to us a rhonchus, even a very loud one, when we perceive nothing by the unassisted ear. When examined by the cylinder, this rhonchus, which has its seat in the trachea, has almost always the character of the mucous rhonchus described above. The bubbles seem to be extremely numerous and very large. The sound is occasionally so loud as to resemble a drum, or the noise of a carriage on the pavement. In these cases the rhonchus is perceived over the whole sternum, and is accompanied by a vibration very perceptible to the touch: we can even sometimes perceive it over the whole chest and through the interposed lung. In this last case, however, there is no vibration attending it, and we recognize, at once, that the sound originates in a remote point. This variety of rhonchus is sometimes so noisy as to mask the sound of the heart's action, and also of respiration, over a great portion of the chest; and in all cases where it exists in a certain degree of intensity, we are unable to perceive the heart's pulsations under the sternum, unless we request the patient to suspend respiration for a moment.

The tracheal rhonchus is only observed in this great degree, in violent hæmoptysis, and in the severer paroxysms of the mucous catarrh of old persons termed *suffocative catarrh*. It is found in most dying persons, particularly in cases of phthisis, peripneumony, diseases of the heart, and severe idiopathic fevers. In all cases, when it exists in a high degree, it may be regarded as of evil omen. In a lesser degree, it exists in the acute pulmonary catarrh, in the severe cases of the chronic mucous catarrh, and in all diseases complicated with these. It may be reckoned as one of the worst symptoms which appear in fever. In concluding this notice of the tracheal rhonchus, it ought to be observed, that when too slight to be heard by the naked ear, it becomes very manifest on applying the stethoscope.

The mucous rhonchus, properly so called, exists principally in the pulmonary catarrh with copious secretion of mucus, and in hæmoptisis; and often also in peripneumony and phthisis. In the two former diseases, it is caused by the transmission of air through the mucus or blood contained in the bronchi; in the two latter, it may have its seat in the same place, but it may also originate in cavities produced by an abscess or eschar of the lungs, or by softened tubercles. In the latter cases, the rhonchus has a peculiar character which I shall denominate *cavernous:* it is more than usually *abundant* and *large*, and is confined also to a small space, within which we commonly observe, at the same time, both the cavernous respiration and pectoriloquism. It is more especially during the act of coughing that we detect this circumscribed or cavernous rhonchus. On some occasions, we can even distinguish the consistence of the fluid contained in the excavation, by means of the particular impulse communicated by the cough.*

In certain rare instances the mucous rhonchus may be recognized, or at least suspected, independently of auscultation, either mediate or immediate. I have sometimes noticed, while percussing the clavicle or neighbouring parts of the chest, in phthisical cases, a sort of vibration like that yielded by a cracked pot when gently struck, accompanied with an evident hollow resonance, and even with a humid crepitation or guggling. The phenomenon indicates the presence of tuberculous excavations near the surface of the lungs. It is, however, by no means common, and has only been observed in subjects with very thin elastic chests, and (perhaps) with the clavicular ligaments more than usually lax.[*] Some of these patients are themselves conscious of the guggling of the tuberculous matter, during percussion; and others can point out the seat of the excavation, from the sensation occasioned by the detachment of the sputa from it during expectoration. This last circumstance is, however, very uncommon.

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* *The cavernous rhonchi.* This variety deserves a more distinct notice than Laennec has given it. All the other rhonchi, although depending on a morbid condition of the part in which they originate, still have their site in cavities naturally existing in the state of health: the cavernous rhonchus is in every respect morbid—in its site as well as its cause. It may exist, is stated in the text, in all cases where there is a morbid excavation in the lungs containing a fluid, and communicating with the bronchi; as in circumscribed abscess, and in local gangrene of the lungs, and in the latter stages of tubercle. The last named is by far the most usual source of this sign, insomuch that I doubt if it arises once in a hundred times from any other cause. It is characterized by a strongly marked mucous rhonchus or guggling, confined to a small spot, instead of being diffused over a considerable portion of the lung, as is usually the case with the common humid bronchial rhonchus. It is particularly heard upon the patient taking a deep inspiration, or after coughing; and if, under such circumstances, it is very strongly marked, continues fixed in the same point, and is not heard in any other, it is one of the surest signs of tuberculous excavation, even without pectoriloquy and the cavernous respiration, which will generally be perceptible in the same point. Andral, a high authority, considers this circumscribed bubbling rhonchus, when well marked, as the very surest sign of a tuberculous cavity.—*Transl.*

I have sometimes also perceived in tuberculous excavations of the upper lobes, a mucous rhonchus, or slight guggling, corresponding with, and no doubt caused by, the pulsation of the subclavian artery. This case is extremely rare, as indeed it must be, when we consider the numerous circumstances that must conspire towards its production. In an equally rare class of cases, a strong mucous or cavernous rhonchus can sometimes be perceived by the naked ear, or on applying the hand to the part. I do not here allude to the guggling rhonchus of the trachea or the bronchi, already noticed, but to one confined to a small space, and this often at a distance from the larger bronchial tubes. I have observed this phenomenon only in cases where the matter of an excavation had made its way through the walls of the chest, and formed a tumour beneath the skin; or where it had escaped into old cellular adhesions uniting the lungs to the chest; or, finally, where a large anfractuous excavation, half full of matter, lay near the surface of a lung closely united to the walls of the chest.[†]

3. *The dry sonorous rhonchus.*[‡] This is more variable in its character than the two preceding kinds. It consists in a flat (grave) sound, sometimes extremely loud, resembling at times the snoring of a person asleep, at other times the sound produced

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[*] This sign has been noticed somewhat in detail by M. Martinet in the *Revue Med.* tom. ii. 1824, p. 253. It was previously pointed out by Laennec in his first edit. tom. ii. p. 64, and was known to him, he says, as early as 1816. He says he has not met with it more than twenty or thirty times in all. According to him, it may be readily confounded with the jingling of a metallic ornament worn on the breast, such as a loose-jointed cross, for instance. In phthisical subjects, in whom it usually occurs, it is found by far more distinct, if we percuss while they are speaking. It is also found, but rarely, in cases of dilated bronchi. Andral has observed this sign in three cases only. In all these it correctly indicated the existence of a tuberculous cavity. *Clin. Med.* tom. iii. p. 65.—*Transl.*

[†] Sometimes when the sound of respiration is suspended or very weak, the *bubbles* of the mucous rhonchus become very small, few in number, and not perceptible, except on a deep inspiration: at other times, when the respiration is pretty good, it is found not to be *pure* or *clear*. An inexperienced auscultator might be apt to confound these varieties (which may be named *obscure*) with a weak crepitous rhonchus.—*Author.*

[‡] Dry bronchial rhonchus.—*Transl.*

by friction on a bass string, and occasionally the cooing of the wood-pigeon. This resemblance is sometimes so striking, that we might be tempted to believe the bird concealed under the patient's bed. This last variety of sound is commonly confined to a small space. I have sometimes observed it in cases of pulmonary fistulæ of a middling size, and also in cases of dilated bronchi. I apprehend it can hardly exist in bronchial tubes of a small diameter. We must not confound the sonorous rhonchus with the guttural sounds formerly mentioned, (p. 32,) which, unlike this, have their seat in the fauces, as may be ascertained by the application of the stethoscope.

It is difficult to ascertain the precise cause of this species of rhonchus. Neither the character of the sound, nor the examination of the parts after death, leads to the belief that it depends on the passage of the breath through any kind of matter. On the contrary, it would seem to depend rather on some alteration in the shape of the tubes through which the air passes, and I am disposed to attribute it in most cases to the contraction, from some cause or other, of the origin of a bronchial branch. This contraction may be either permanent or temporary, and may be occasioned by the pressure of an enlarged gland, or of a circumscribed spot of inflammation, the presence of a tenacious clot of mucus, or the local thickening of the mucous membrane. It may not be easy on these grounds to explain the reason of the key of the sound being flatter instead of sharper, as might be expected from the contraction of the aperture; but we have an analogous case in the thickening of the membrane of the larynx and glottis in catarrh, when the voice, as we know, becomes hoarser and flatter than natural.*

4. *The dry sibilous rhonchus.* This is also of very various character. Sometimes it is like a prolonged whistle, flat or sharp, dull or loud; sometimes it is very momentary, and resembles the chirping of birds, the sound emitted by suddenly separating two portions of smooth oiled stone, or by the action of a small valve. The different kinds often exist together in different parts of the lungs, or successively in the same part. The peculiar nature of the sound, and the appearances on dissection, seem to prove the sibilant rattle to be owing to minute portions of very viscid mucus obstructing, more or less completely, the small bronchial ramifications. This explanation applies more especially to the variety resembling the sound of a valve, which is indeed only a variety of the mucous rhonchus: the kind more strictly sibilous, is probably occasioned rather by a local contraction of the smaller bronchi, from thickening of their inner membrane.

5. *The dry crepitous rhonchus, with large bubbles.*† This species is observed only during inspiration. It conveys the im-

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* Dry vesicular rhonchus.—*Trans.* Crackling rhonchus.—(*M. L.*)

pression as of air entering and distending lungs which had been dried—and of which the cells had been very unequally dilated, —and entirely resembles the sound produced by blowing into a dried bladder.

This variety is the pathognomic sign of emphysema of the pulmonary substance, and of the interlobular emphysema. In the last disease it is much more distinct. We have a sound like this in the common sub-cutaneous emphysema, on pressing interruptedly with the ear on the stethoscope, or with the fingers, in the vicinity of the affected part.

Besides the peculiar sound produced by the various species of rhonchus, there is also to be noticed a slight vibration communicated to the cylinder when the seat of the phenomenon happens to be immediately beneath it. This sensation, like that occasioned by the voice, (p. 32,) may sometimes be felt by the hand very distinctly. It is usually very strongly marked in the mucous and sonorous rhonchi, less in the crepitant, and still less in the sibilous. When the rhonchus has its seat remote from the point where the instrument rests, although it is heard very strongly, no vibration is felt; and when this can be discovered in no point of the surface of the chest, we may conclude that the cause of the rhonchus exists in the central parts of the lungs. This distinction may appear subtle, but I can assure the reader that it is one very easily made; and that a very little experience will enable any one to ascertain the distance of the rhonchus from the point of exploration.

Some of the species of rhonchus, especially the mucous and crepitous, cannot be distinguished at the distance of one or two inches from their site. The other kinds may frequently be perceived through the whole width of the chest, and are thus often combined with the former. In this manner, while we perceive a mucous rhonchus on one side of the chest, we may at the very same instant hear a dry sonorous rhonchus, which has its seat in the opposite lung. This complication is, however, very easily distinguished from a simple mucous rhonchus, however noisy.

From the very striking and conspicuous characters of the various *rhonchi* described, it might be imagined that they would furnish some of the most valuable of our diagnostic signs. Taken singly, however, they are very inferior in their respect to the data supplied by the auscultation of the respiration and the voice. Conjoined with other signs they become extremely valuable: the two crepitous rhonchi, and also and more especially the cavernous, are frequently more certain than any other of our signs.*

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* In reference to all the louder rhonchi, it is well to recollect that they are often audible through a pleuritic effusion: we must not therefore conclude from their mere presence, that the lungs are in contact with the chest.

In exploring the chest for the rhonchus, we use the stethoscope without the plug.—*Trans.*

II. *Of the metallic tinkling.*

This phenomenon consists of a peculiar sound which bears a striking resemblance to that emitted by a cup of metal, glass, or porcelain, when gently struck with a pin, or into which a grain of sand is dropped. This sound does not at all depend on the nature of the materials of which the stethoscope is composed: it is perceived during respiration, speaking and coughing; but is much more perceptible during the two latter than the former. The reverse of this is, however, sometimes the case. It is, in general, heard in a most striking manner, during coughing; and when in any degree doubtful, this action ought to be performed.

The metallic tinkling produced by the voice, differs according as pectoriloquy exists or not. In the former case, *the tinkling*, as well as the voice, traverses the tube; in the latter, we merely hear within the chest a slight sharp sound like that occasioned by the vibration of a metallic cord touched by the finger.

The metallic tinkling always originates in a morbid excavation within the chest, containing partly air and partly liquid. It exists only therefore in two cases—viz. where a serous or purulent effusion coexists with pneumo-thorax; or when a large tuberculous excavation of the lung is only partly filled with very liquid pus. It is further necessary for the manifestation of this phenomenon, in cases of empyema or hydro-thorax complicated with pneumo-thorax, that the cavity of the pleura should communicate directly with a bronchial tube by means of a fistula, such as has place when a tuberculous vomica, abscess or eschar of the lungs, opens into the chest. This sign may, on this account, be considered as pathognomonic of this triple lesion.[*] From it we may also further have an idea of the size of the fistulous perforation, as well as of the relative proportion of air and liquid in the chest; since the phenomenon is more distinct according as the fistula is larger; while the extent of the vibrations of the sound corresponds with the extent of the spaces occupied by the air.[†]

Sometimes the tinkling assumes another character, and strikingly resembles the sound produced by blowing into a flask or bottle. This, like the tinkling, is equally produced by the cough, voice, or respiration; and in some cases the tinkling accompanies one of these, and the buzzing the other. I have named it from analogy, *utriculor buzzing*, or *amphoric resonance* (*bourdonnement amphorique*). This sound sometimes co-exists and sometimes alternates with metallic tinkling. Where the resonance or buzzing exists alone, or much more frequently than the tinkling, I have been led to attribute it either to there being more than one fistulous opening, or to the cavity in which it originates being very large, and containing only a very small quantity of liquid.*

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[*] Dr. Williams has shown (Rat. Expos. p. 136, et seq.) that communication with the bronchi is not essential to the production of this phenomenon; and certainly, in one of the most distinct examples of the phenomenon that I ever met with, no communication could be discovered, on dissection, between the bronchi and the fluids on the sac of the pleura.—*Transl.*

[†] This may also be very exactly done by means of auscultation and percussion: the latter gives the sound of great emptiness, intermixed now and then with tinkling. I conceive that the phenomenon will be less distinct when the liquid is in *very small* quantity, than where it is in more equal proportion with the air.—*Author.*

I had long suspected that the metallic tinkling and amphoric resonance would be heard after the operation of empyema, but it was not till April, 1822, that I was enabled to verify my conjecture, in the case of a patient who had been operated on about a month before. When an injection was thrown in by the wound, the fall of the liquid upon that previously in the cavity of the chest, produced a well-marked tinkling. The stethoscope did not detect any respiratory sound in the part affected, but the entrance and escape of the air through the wound gave rise to an extremely distinct utricular buzzing. Upon plugging the wound, a slight and dull hissing, occasioned by the passage of the air by the side of the tent, was only heard; but when the patient spoke, a distinct tinkling was perceived. This last fact would seem to show that a large communication with the external air converts the tinkling into simple buzzing. It is worthy of note in this case, that there was no fistulous communication between the pleura and bronchi, and consequently that the tinkling sound could only be produced by the vibration occasioned by the resonance of the voice in the lung, which latter, it is further to be observed, was greatly compressed and covered with a strong false membrane. The metallic tinkling and utricular buzzing never exist unless where the air in the pleura communicates with the bronchi, except in the rare case mentioned in the first note in this page.†

I expect that future observation will discover other phenomena foreign to those naturally produced by the respiration, cough, and action of the heart, and which may prove useful signs in particular cases; yet I think it probable that such signs will be few in number; since, in the period that has elapsed since the publication of my first edition, my own researches, as well as those made in all the hospitals of Paris by a great many physicians and pupils, have discovered only a single one of the kind. I owe this to Dr. Honoré, who first perceived it in a case of pleuro-peripneumony in the spring of 1824, and afterwards in June the same year. This latter patient I saw, and made the following observations on his case: the sound of respiration was feeble over the whole chest, and nearly extinct in the inferior part of the left side, which had been the seat of the effusion. On applying the stethoscope on the fourth rib, about three inches from its cartilaginous portion, I perceived a dull sound, such as would be produced under the stethoscope by the friction of the finger against a bone, and further conveying the sensation as of a body rising and falling, and at the same time rubbing somewhat harshly against another. The site of the phenomenon was evidently very close to the walls of the chest. It was only very distinct when the inspirations were deep; and at these times not only was the patient sensible of the circumstance, but it was perceptible to us on applying the hand over the part. I have since observed the same thing in twelve or fifteen cases, under different circumstances, and have been able to ascertain its most frequent cause. In most cases, then, this phenomenon (which I shall call the *sound of friction* of ascent and descent) is occasioned by the interlobular emphysema of the lungs. Together with the *crackling rhonchus*, or *dry crepitous rhonchus with large bubbles*, it is indeed the pathognomonic sign of this lesion; and, as will be seen hereafter, may offer many varieties of character.

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* The metallic tinkling is also sometimes heard independently of the voice, cough, or respiration; namely, when a patient affected with pneumo-thorax with liquid effusion, is placed in the sitting posture, and some of the fluid which still adheres to the upper part of the cavity, falls in drops into that beneath.—*Author.*

† There is a phenomenon of no value as a sign, but which an inexperienced observer might perhaps mistake for the metallic tinkling. If one percusses the chest at the same time that the stethoscope is applied, more especially close to the instrument, we perceive a sort of *metallic clicking*, very like that produced by the handling of fire-arms in the military exercise. The same is sometimes perceived, in a less degree, during coughing.—*Author.*

In passing in review all the known lesions of the lungs and pleura, there is one other which might possibly give occasion to this sound of friction,—the existence, namely, of a cartilaginous, bony, tuberculous, or other indurated tumor projecting from the surface of the lung. This is, however, a mere conjecture; but should it prove true, it is probable that the case in question would be readily distinguishable from emphysema,—firstly, because it would present none of the other signs of the last-mentioned disease; and secondly, because, owing to the accompanying humidity of the surfaces, the resulting sounds would be duller and softer.*

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* Subsequent observations have enabled M. Reynaud to establish the fact which Laennec only conjectured. The sound of friction is perceived in every case where the pleura is rough or uneven. It exists in pleurisy with little or no liquid effusion, and where the pleura is merely covered with a false membrane; and likewise in cases where the fluid is only in moderate quantity, and the free motion of the lung is not impeded by ancient adhesions. In this last case, when the lung, in certain positions of the body, rises above the level of the effusion, and rubs against the thoracic parietes, the sound of friction is heard immediately over this point. When the effusion becomes considerable, it disappears, and again returns when the fluid is lessened. In most cases the sound is perceptible by the application of the hand, as well as by auscultation: it may even be heard at some distance from the patient; and sometimes it is very perceptible to the latter. The sound of friction is not, it will now be perceived, exclusively confined to the case of pulmonary emphysema:

As the exploration of the heart and large vessels affords only diagnostic signs in the diseases of these organs, I shall defer the notice of this branch of auscultation until I come to treat of them. and I shall transfer to the Appendix the application of the method to the diagnosis of several cases unconnected with diseases of the chest.

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it is met with in pleurisy, and may be regarded as a good sign, since it indicates that the effusion is not so great as to prevent the lung from being dilated, so as to reach the walls of the chest. Neither does it appear, as Laennec imagined, to be different in the two cases. I am even disposed to believe, that when it exists in emphysema, this affection is complicated with pleurisy. In confirmation of this, I may state, that in the notes of Laennec's own cases taken by myself, I find, almost always, this complication expressly named, where the sound of friction is recorded. The same observation applies to M. Reynaud's third case (Journ. Hebd. No. 65); and even Andral bears testimony to the accuracy of M. Reynaud's views. (Clin. Med. t. ii. p. 613, 2nd Ed.)

The foregoing pathological facts led M. Reynaud to examine whether there might not exist an habitual friction between the pulmonary and costal pleura in the state of health. And this seemed established by *a priori* considerations,—namely, by the invariable formation of an accidental serous tissue wherever a false joint or accidental movement is established, and by the obliteration of the articular serous cavities on the abolition of all motion of the parts. With the view of proving the fact, M. Reynaud made an experiment on a living animal, and believed that he could distinctly perceive the motion of the lungs against the ribs during inspiration and expiration. In the state of health, the sound produced by this friction of the parts is not perceptible, owing to the slippery smoothness of the two membranes, or is confounded with that of the respiration; but when the natural condition of the parts is altered by inflammation or any other cause, it then becomes manifest. (See Journ. Hebdom. de Med. No. 65.)—*M. L.*

PART SECOND.

DISEASES OF THE BRONCHI, LUNGS, AND PLEURA.

I SHALL not here attempt, with the Nosologists, to divide the diseases of which I propose to treat, into genera and species. Such an arrangement appears to me incompatible with the nature of medical science. The zoological and botanical species are distinct beings, while diseases are merely modifications in the texture of the animal organs, in the composition of their fluids, or in the order of their functions. I shall still less endeavour to ascertain the primary, or, as they are called, *proximate* causes of diseases. The vanity of researches of this kind is sufficiently proved by the profound oblivion into which all theories of this nature have successively fallen. I shall content myself with describing the diseases of the thoracic organs,—that is to say, such pathological phenomena as are well marked and easily distinguishable from others. I will state the characters by which they may be recognized during life and in the dead body; and the treatment which experience has proved to be most efficacious.

When the disturbance of the functions, which is in fact, properly speaking, the disease, is clearly dependent on the change of structure, or is so connected with this as to bear a direct relation to it as to intensity, I shall commence the description of the disease with this organic alteration; because it constitutes the part of the disease which is most positive and least subject to variation.

In this way, I shall successively notice all the organic lesions to which the several textures of the lungs are subject. Afterwards I shall examine the disorders of this organ, which may exist without any discoverable change of structure, and which must, therefore, be considered rather as alterations in the fluids, or in *that which gives motion* (to use the language of Hippocrates —*τὰ ὁρμοντα*,) in other words, *nervous diseases.*

BOOK FIRST.

DISEASES OF THE BRONCHI.

CHAPTER I.

OF THE CATARRHAL AND INFLAMMATORY AFFECTIONS OF THE MUCOUS MEMBRANE OF THE BRONCHI.

THE inflammatory affections of the mucous membrane of the bronchi, may be divided into the *catarrhal,* the *plastic* or *crusty,* and the *ulcerous.*

The pulmonary catarrhs present a great many varieties in respect of the nature and quantity of the expectoration, of the acute or chronic state of the disease, or of the accompanying circumstances. I shall describe them in the following order:—1. the acute mucous catarrh; 2. the chronic mucous catarrh; 3. the pituitous catarrh; 4. the dry catarrh; and shall conclude by noticing some other varieties produced by the difference of the occasional causes and other accessory circumstances.

I prefer the term *catarrh* to that of *bronchitis,* employed by some modern authors, because catarrh forms the link which unites the inflammations to the congestions, and to the fluxes purely passive, and because in certain cases of chronic catarrh, it is at least very doubtful whether the disease be really an inflammation or not.

SECT. I. *Of the acute mucous catarrh.*

Pulmonary catarrh is unquestionably one of the most frequent of diseases, insomuch that most persons are affected with it, in some degree or other, almost every year. Notwithstanding this frequency, it is perhaps less understood than many rarer diseases. In most cases, it occurs in so slight a degree as scarcely to derange, in any respect, the functions of the body, or to prevent the individual from following his usual occupations; occasionally, however, it is of sufficient violence to endanger life.

Doubts may still be raised respecting the nature of this disease.

If in some cases it approaches the nature of croup, a complaint eminently inflammatory, in most other instances it exhibits the character of a simple congestion merely, and in some, those only of an atonic or passive congestion. Its causes are not better understood: for, to notice only the one most commonly adduced, it seems certain that the change from heat to cold does not produce it more effectually, than the change from cold to heat. The effects of catarrh are equally matter of dispute;—many still considering it, with the ancients, as the cause of phthisis, while the result of modern pathological researches appears, to others, entirely to invalidate this opinion.

Anatomical characters. A redness more or less marked, and at most a slight thickening of the internal membrane of the bronchi, are the only traces which this disease leaves in the affected organs; if we except a certain quantity of phlegm in the bronchi, resembling that expectorated by the patient. The redness and swelling very rarely occupy the whole bronchial membrane, even of one lung. When the contrary is the case, the disease is very severe, and accompanied by a violent fever. Most commonly there is congestion only in certain parts of the membrane, in one or both lungs, even when there is much fever and expectoration. The portions which are red and swollen, are usually more consistent than natural; sometimes they are somewhat softer, particularly in the catarrhs which accompany severe fevers; and occasionally, the degree of the softening is equal to that which occurs in the mucous membrane of the stomach and intestines, in certain cases, and which led Hunter to fancy that this membrane is sometimes dissolved or digested, after death. The extent and intensity of the redness are not always proportioned to the violence of the inflammation, the quantity of the expectoration, or the acuteness of the case. Thus, in the catarrh, whether latent or not, which complicates fevers, we find the membrane swollen and of a livid red over almost its whole extent, and also softened here and there; while in the idiopathic disease, even when very acute, it exhibits marks of inflammation in certain points only.*

The pulmonary catarrh is accompanied, from its very commencement, with a marked alteration of the bronchial secretion. At first this is scantier than natural, or is almost totally suppressed: in the latter case it possesses the characters which we will hereafter notice when treating of the *dry catarrh*. In a short time it becomes thin, transparent, and acrid, or salt to the taste. Towards the end of this second period, especially if this has lasted some days, the expectoration becomes thicker and slightly viscid, without at all losing its transparency; and in certain cases entirely resembles raw white of egg. It then gradually becomes opaque, and assumes a whitish, yellowish, or slightly greenish colour, and is more consistent, but is still viscid. In this state it obstructs, in a greater or less degree, the bronchial tubes, particularly those of a small or middle size, so as to impede the free transmission of the breath, and to give rise to the mucous rhonchus. In this case, the respiration is suspended in the portion of the lungs supplied by the obstructed bronchi, until the phlegm is discharged. The quantity and consistence of the secreted mucus vary extremely. In some cases it is almost as solid as a polypous concretion. M. Andral relates two cases where the principal branch distributed to the upper lobe was obstructed by concrete mucus of this kind; and in one of these it extended into three or four of the divisions of this branch.*

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* It deserves notice, in this place, that the redness and softening of the bronchial membrane are always the more marked according as the examination is remote from the period of death, and the decomposition of the body more advanced.—*Author.*

There exists no sign capable of distinguishing this from other obstructions of the bronchi. In the two cases of Andral, there was sudden dyspnœa, and death within twenty-four hours; but it appears to me doubtful, after what has been stated and what we shall notice hereafter, of the slight degree of inconvenience arising from the suspension of respiration, in even a large extent of lung, that the death of these patients was owing to the cause mentioned. I am the more confirmed in this opinion from having seen cases apparently similar, of which the subjects could hardly be considered as indisposed. The following is a case of this kind: A man forty years of age, and subject to a dry catarrh (which was almost always latent) for the last twenty years, and which had only given occasion during all this time to two or three fits of asthma, was seized, in the winter of 1821, with a slight acute catarrh, which did not prevent him from following his usual occupation. This catarrh was at first dry, and attended with little cough or dyspnœa. After eight days he began to cough rather violently every morning, with the feeling as if something was lodged about the root of the right lung; corresponding to which point, about the inner edge of the scapula, he experienced a sense of great heat. The fit of coughing returned, but with less violence, every evening. Things went on in this way for four or five days, when, during a violent fit of coughing, accompanied with nausea and a great flow of tears, he expectorated an immense clot of mucus, capable of filling a spoon, and weighing more than half an ounce. It was yellow, opaque, viscid, unmixed with air, and of a middle consistence between that of the usual mucous sputa and of false membrane. Immediately after its discharge, the sense of warmth existing in the point mentioned, changed to a painful heat, which lasted nearly all day, but which did not hinder the man from going abroad. For several days after this he expectorated every morning, but with ease, some mucous sputa of a moderate size and the usual consistence; and these entirely ceased within the week.

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* Clinique Medicale, Vol. II. Obs. xi. and xii.

In the different characters of the expectoration, in the successive stages of the disease, we recognize the source of the principal varieties of the pulmonary catarrh. The *dry* catarrh is that which never proceeds beyond the first stage; the *pituitous* is that which stops at the second; and the *mucous* is that which, after passing through the two former, persists in the third.

Symptoms and progress. The pulmonary catarrh is usually preceded by coryza, which is an affection precisely similar of the pituitary membrane. After some days, or perhaps hours, and, in most cases, just as the stuffing of the nostrils begins to yield, the inflammation reaches the air passages. Its transmission to the larynx is indicated by a sense of uneasiness and irritation, or a titillation like that of itching, which provokes to cough; and if the mucous membrane is much affected, there is hoarseness, and occasionally loss of voice. When the inflammation extends to the bronchi, there is sometimes a slight pain, more commonly a sense of dryness and roughness, behind the sternum or at its lower extremity. When the disease is very severe, there is greater, sometimes indeed very sharp, though transient pain extending over the whole chest, particularly after the fits of coughing. When the cough is violent, the patient feels also pain and weakness about the attachments of the diaphragm, along the borders of the false ribs, and in the back.

The cough, at first dry, is soon accompanied by a serous expectoration, which is saltish and slightly glutinous, but not distinguishable from the saliva with which it is intermixed. This, in adults, is usually intermixed with some small *pearly* sputa which are more or less tinged with the black pulmonary matter, and generally softer than those expectorated in the dry catarrh. As the disease advances, the expectoration becomes thicker, and more yellow, and is intermixed with particles of an opaque whitish colour: by degrees the whole becomes opaque, of a pale yellow, or slightly greenish hue, viscid, enclosing air bubbles, tasteless, or somewhat saltish, and occasionally marked with dots, or small streaks of blood. The cough returns by fits, and is more or less frequent according as the expectoration is copious or otherwise; it is particularly troublesome on waking in the morning, and sometimes after meals. When the sputa are very large, they frequently leave, after expectoration, a dull pain about the root of the bronchi, indicative of the place whence they have been detached by the efforts of coughing. Sometimes, as the complaint of the lungs begins to give way, an analogous affection seizes the mucous membrane of the intestines and produces diarrhœa.*

In the greater number of cases, the foregoing are the whole of the symptoms, except that there is occasionally a slight degree of fever during the first few days: this is most perceptible in the evening, and terminates towards morning with a slight moisture on the skin, and a lateritious sediment in the urine. This secretion also sometimes presents a copious mucous cloud or deposit; and this circumstance, together with the heat experienced in passing the urine, would seem to indicate an affection (though a very slight one) of the mucous membrane of the bladder, of the same kind as that of the lungs. Sæpius etiam in hoc stadio morbi, seminis deperditiones noctu interveniunt.

If the disease is more severe, there is fever constantly present, usually accompanied by sweating, and also dyspnœa. This state may last some weeks; and if the local affection is so extensive as to occupy the whole of one lung and part of the other, the oppression of the chest is considerable. In this case, the fever runs high and may assume the characters of continued fever of the severest kind, giving rise to those cerebral and intestinal congestions, and that alteration of the fluids, which usually accompany these affections. This is *the catarrhal fever.* When it is distinguished by paroxysms, the catarrhal affection appears renewed with each of these; the coryza, tightness of the chest, and serous expectoration, coming on with the fit, and the mucous sputa re-appearing at its termination.

Occasional causes. The most common occasional cause is the sudden or long-continued impression of cold when the body is warm. The reverse of this, however, is also a frequent cause, especially in spring. This effect of change of temperature is much more marked in persons accustomed to a sedentary and comfortable or luxurious mode of living: as we see them take cold at their own fire-sides, and even in their beds, much more frequently than the labouring classes who are accustomed to work in the open air The inhalation of acrid fumes, particularly those of chlorine, vinegar, and other acids, sometimes gives rise to pulmonary catarrh; and it is remarkable that the disease, when produced in this manner, is usually slight, and of much shorter duration than when otherwise excited.

Pathognomonic signs. There are none of the symptoms above detailed which can be considered as pathognomonic of the disease. Cough is common to almost all diseases of the lungs. The expectoration is less equivocal, yet is insufficient to distinguish pulmonary catarrh from certain cases of peripneumony, pleurisy, or phthisis. The other symptoms may be met with in almost all diseases. Auscultation, however, either singly or conjoined with percussion, furnishes us with several signs sufficient not merely to characterize the disease, but to point out its actual severity, and to discriminate it from all others.

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* This tendency of catarrh always to *descend* had not escaped the notice of the ancients, and no doubt gave occasion to its name—from *ῥέω fluo* and *χατὰ deorsum.* —*Author.*

This is a strained interpretation. The nomenclators of the disease, no doubt, were satisfied with the observation of the discharge *flowing downwards* from the head or nose.—*Transl.*

When the catarrh is simple, however violent it may be, percussion yields every where the natural sound. At the invasion of the disease, when there is only coryza, with hardly any cough, or with merely a slight irritation in the fauces, the stethoscope applied to the chest indicates, even in this stage, a rhonchus which is often very loud. This rhonchus is usually sonorous and deep, (*sonore-grave*,) but sometimes sibilous; its precise seat being indicated by the attendant vibration. When the rhonchus is very loud, it may be heard (but less distinctly and without any accompanying vibration) at a considerable distance from its site: and in this case, even though possessing the deepest or gravest tone in its proper site, when examined at the remotest point where it can be heard, it seems to become sharper and somewhat like the sibilous rhonchus.

The rhonchus is the more sonorous and flatter in proportion as the mucous membrane is more tumefied and its secretion scanty. When so strong as to resemble the prolonged scrape of the bow on a large violoncello-string, or the note of the wood-pigeon, there are usually redness and swelling of the membrane at the bifurcation of some of the principal bronchi. As the disease advances, and the mucous secretion increases, the sound gradually assumes the characters of the *guggling* or *mucous* rhonchus, formerly described.

By means of this sign we can readily ascertain the site and extent of the disease. If this is only partial, as is usually the case, the rhonchus is equally partial. The knowledge of this fact is very important, as the danger of the disease is always proportioned to the extensiveness of the local affection. When the rhonchus exists in the whole of one lung, or in the greater part of both, the disease is always severe; when it exists over the whole of both, (which is only the case when catarrh supervenes to a severe idiopathic fever,) death almost always follows, except in very early age. When the disease is slight and confined to a small portion of the membrane, the mucous rhonchus only exists in the morning previously to expectoration.

One of the most remarkable things attending the stethoscopic exploration of pulmonary catarrh, is the occasional suspension of the respiration in the affected part. This, which may be considered as pathognomonic of the disease, frequently comes on all at once, and passes off in like manner, after coughing or expectoration. It is occasioned by the temporary obstruction of one of the bronchial tubes by the mucus contained in it. Sometimes the respiration is not entirely suspended, but only greatly diminished, so as to be scarcely heard, except by means of a slight mucous or *obscure* sibilous rhonchus, which is now and then perceptible. This rhonchus seems formed by as small bubbles as those of the crepitous, only they are more *isolated*, and evidently produced by a more glutinous fluid; and now and then they give a slight click, as of a valve.[*] This modified suspension of respiration is occasioned by the intumescence of the inner membrane of the smaller bronchi. It is necessary to remark, that even in the most complete suspension of respiration from the cause above mentioned, the sound is rather masked or suffocated, than totally extinct, as in peripneumony. Experience alone can enable us to make the distinction between these two negative sensations. This suspension of the respiration might readily mislead an inattentive observer, and induce the belief of hepatization of the lung or effusion into the pleura: but percussion removes at once all doubt, by eliciting, in the case of catarrh, the natural sound from the part destitute of respiration. It is indeed true, that this circumstance will not distinguish this disease from pneumo-thorax and emphysema of the lungs; but we shall hereafter find sufficient distinctive signs for these diseases also.[†]

Treatment. Although this disease consists in an inflammation of the mucous membrane of the lungs, bleeding is rarely useful in it, except in very robust subjects, or where the symptoms are so severe as to threaten peripneumony, or where there is blood in the expectoration. Accordingly, this measure, with the exception just named, has always been rejected by good practitioners, as rendering the disease of longer duration, and as diminishing and sometimes checking the expectoration. Leeching has the advantages and disadvantages of venesection, only in a less degree. Cupping is in general more useful. By using many glasses, and yet taking away only a small quantity of blood at once, and, more particularly, by keeping the glasses applied for a considerable time, so that the tumefaction produced by them does not too speedily subside, we frequently obtain, in the severer cases, marked relief of the oppression and other symptoms. Blisters are not so beneficial. Sometimes they are hurtful, producing an increase of fever, and augmenting the bronchial congestion: this is more especially the case when they are applied during the acute stage, and to the chest. When the disease has been of some continuance, and there seems reason to apprehend its becoming chronic, or if it be supposed to be grafted on a latent tuberculous state of the lungs,—in either of these cases a blister to the arm may be useful, particularly if the discharge is kept up for some time. In the case of females, it is in general preferable to apply the blister to the thigh, as being less apt to occasion suppression of the catamenia in this situation. Emetic medicines have been much employed in this disease, more particularly ipecacuan and the emetic tartar. They have been had recourse to either with the view of producing vomiting or nausea, or given in doses so small as not to occasion any perceptible effect, but with the intention of favouring expectoration, or determining to the skin. There can be no doubt that vomiting is often beneficial in the outset of catarrh, provided no inflammatory state of the stomach exists. It is also necessary where the disease is complicated with a bilious affection, as is commonly the case in seasons when the latter class of disorders prevails. The tendency of vomiting to produce moisture on the skin, and to facilitate expectoration, is well known: but the beneficial influence of the same medicines given as *incisives*, that is, in small doses,—or of the other simple nauseating preparations occasionally substituted for these, such as the oxymel of squills, kermes mineral, &c.—is much less certain. The efficacy of emetics is much greater in the case of children, who are in general found to bear this kind of treatment better than adults. To the former they may be given, without inconvenience, every other day, or even every day for a week or more; and this practice affords the best guard against the catarrhs of early infancy degenerating into the hooping cough.

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[*] It is this *obscure* mucous rhonchus which has led some persons to believe that the crepitous rhonchus was not confined exclusively to pneumonia. It is, however, proper to remark, that a very acute pulmonary catarrh affecting the minutest bronchi, is very nearly allied to pneumonia, and it is reasonable that there should be a corresponding approximation of the characters of the sounds in the two cases; still the two rhonchi must not be confounded.—(*M. L.*)

[†] The partial suspension of the respirary sound in pulmonary catarrh is always momentary. Most commonly if we keep our stethoscope on the same spot for a minute or two, we shall find the respiration, which had previously been weak or almost extinct, become all at once puerile, and *vice versa*. The same is true of the rhonchus, which is found to change its character and its site every instant, becoming, by turns, sonorous, sibilous, mucous, and this latter varying in its peculiar characters. This variableness of the auscultatory phenomena is strikingly characteristic of pulmonary catarrh.—(*M. L.*)

It is usual to prescribe through the whole course of catarrh, various emollient drinks, of which sugar, gum, and infusions of the most inert plants, form the basis; and as most cases of the disease are only slight, these constitute, in general, the sole treatment: or it may be said there is no treatment; since these substances, rather alimentary than medicinal, are in fact mere pretexts of the *expectant* method. This truth is known to the vulgar, and is well embodied in the adage, "a cold well nursed lasts forty days, and a cold not nursed lasts six weeks." And even this is perhaps according more to the treatment than it deserves: but in general the disease is too slight to require one more energetic.

There remains to be noticed another mode of treating catarrh, equally popular, and practised from time immemorial, although less countenanced by physicians, probably from apprehension of its ill effects,—I mean the use of spirituous preparations, such as warm wine, burnt brandy, and punch. This plan is unquestionably eminently successful in a vast number of cases. By it we frequently observe a cold, which seemed to threaten great severity, cured all at once in the course of a single night. The fear of converting catarrh into peripneumony, is no doubt what prevents this plan being commonly adopted by practitioners; and I must confess that the same reasons influenced my own conduct formerly. My experience, however, has given no countenance to such apprehensions; and I accordingly now always employ this kind of treatment where there exists no clear contra-indications, such as an inflammation of the stomach or intestines, or a strongly-marked sanguine constitution, or one easily excited by spirits, or a disease so violent as to give reason to apprehend the supervention of peripneumony or croup. My plan is to give to the patient at bed-time, an ounce or an ounce and a half of good brandy in double the quantity of an infusion of violets, made very hot and sweetened with syrup of marsh mallows. This dose is usually followed by a copious perspiration towards morning; but frequently the disorder is cured without any perspiration. If this is not the case, the same plan is followed for several nights successively. It is particularly in the very onset of catarrh that this treatment is most successful; it is much less so after the supervention of the loose expectoration.*

I do not believe that this stimulant treatment can be safely applied (as it is by the common people) to diarrhœa, even when arising from cold, and appearing to differ from pulmonary catarrh only in its seat; since I have witnessed the supervention of peritonitis, severe dysentery, and arachnitis, to fluxes suppressed by the use of hot wine and spices. This imprudent extension of a useful practice has originated in the expectation of curing, by producing sweat, all other diseases, as well as catarrh, which manifestly originate from cold; a theory, by the way, derived from high medical authority (Van Helmont); as is the case with all the medical prejudices and errors current among the vulgar.†

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* Or opium may be substituted for alcohol. An ounce of syrup of poppies or of opium, taken at one dose at bed-time, in a cup of very hot tisan, excites perspiration even more certainly than the author's punch, and has the advantage, moreover, of soothing the cough and promoting sleep. This remedy, however, like punch, must be used with much caution and reserve.—(*M. L.*)

† A catarrh, or *common* cold, as it is called, is of such every day occurrence, and in general of such moderate severity, as seldom to come within the pale of formal medical treatment. The very tolerable amount of its evils, and the confident expectation of being speedily freed even from these, by the simple processes of nature, no doubt render it frequently of long duration, when it might be removed very speedily, and occasion many remedial measures of well-known efficacy to fall into neglect. Of this kind is the inhalation of the steam of warm water, conjoined with the internal use of diaphoretics and the application of steam to the surface of the

SECT. II. *Of the chronic mucous catarrh.*

The anatomical characters of the chronic mucous catarrh, are nearly the same as those of the acute, insomuch that, in the majority of cases, it would not be possible to distinguish the two diseases in the dead body. It may, however, be observed, that, in the chronic affection, the membrane is more frequently of a violet colour, and irregularly marked here and there with spots of a paler or darker hue, while in the acute, the red is brighter, and verging more towards purple or brown. But these shades of difference are frequently inappreciable, owing to the vascular congestion occurring after death, and which always exists in the lungs, in a greater or less degree. And it is by no means rare, particularly in old subjects, and in catarrhs of long standing, to find the membrane very pale throughout, or of a yellowish colour, with a scarcely perceptible shade of red.[*] The chronic catarrh is sometimes accompanied with a general or partial dilatation of the bronchi,—an affection which I shall notice hereafter.

The expectoration in the chronic disease is sometimes precisely similar to that of the latter stage of the acute; but most commonly it is less glutinous, more opaque, and nearly puriform. Occasionally, it is of a dirty greyish or greenish hue, from an admixture of the black pulmonary matter; and in this state it cannot be distinguished from the expectoration of phthisis. Sometimes, but rarely, it is tinged with blood, an appearance which generally indicates either a local fullness of the vessels, of little consequence, or the supervention of the acute to a chronic affection. It is usually inodorous, but sometimes becomes more or less fetid, and assumes the smell as well as the other physical

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body, formerly recommended by Mr. Mudge, and described in his very excellent Essay, entitled "A Radical and Expeditious Cure for a recent Catarrhous Cough," 2nd Ed. London, 1779. Whoever will be at the expense of procuring his *Inhaler*, and will take the trouble to use his process at the exact period of the disease, (*i. e.* at the very onset,) and precisely in the manner recommended by him, at page 134 et seq., will, I doubt not, find therein a remedy at least as efficacious and speedy, and certainly more safe, than the spirituous treatment of our author. But, perhaps, after all, for those who have leisure for such luxurious medication, and who do not consider such a restrictive mode of cure as worse than the disease, the safest and surest remedy is to lie in bed and live on *slops* for a day or two.

A mode of treatment of recent catarrh, of a somewhat novel character, has lately been promulgated by Dr. Charles Williams, in the Cyclopædia of Practical Medicine (vol i. Art. *Coryza*). This consists essentially in *the total abstinence from liquids*. Dr. Williams speaks most confidently of the efficacy of this plan, and I can myself corroborate his statements as far as a few trials in my own case go. "To those (says Dr. Williams) who have the resolution to bear the feeling of thirst for thirty-six or forty-eight hours, we can promise a pretty certain and complete riddance of their colds, and, what is perhaps more important, a prevention of those coughs which commonly succeed to them. Nor is the suffering from thirst nearly so great as might be expected." (Loc. Cit. p. 481.)—*Transl.*

[*] Bayle, *Recherches sur la Phthisie*, obs. 49; Andral, *Clin. Med.* t. ii. obs. 16.

qualities of the different kinds of pus: having, at one time, the smell of good pus from a recent wound; at another, the strong odour of the contents of a large abscess, and occasionally approaching the gangrenous fetor. After a period, this bad smell disappears, and may return perhaps several times in the course of the year. The quantity of the expectoration is more variable from day to day, but almost always greater than in the acute disease. It not unfrequently amounts to one or two pounds in the course of twenty-four hours. It is increased on every fresh attack of cold; or rather the mucous secretion is at first less, with more watery discharge, and then, after a few days, becomes more copious. In some rare instances it becomes all at once, and usually without obvious cause, so very abundant and puriform, as to lead to the suspicion of a vomica being opened into the bronchi; a mistake which is more likely to happen on account of the oppression which usually precedes and accompanies this state. The oppression, however, is owing merely to a great increase of the morbid secretion. Nevertheless, when the expectoration happens to be difficult, from weakness or otherwise, the case just mentioned forms one of the varieties of the suffocative catarrh.*

Hæmoptysis of any degree of severity, is of much rarer occurrence in the simple chronic catarrh than in persons with no apparent disease.

The disease I have been describing is very common in old persons, and is indeed the most frequent infirmity of age. It is not very rare even in infancy, particularly after hooping-cough; and in this case it sometimes persists through the course of a long life. It seldom begins in the middle period of life. The repulsion of cutaneous eruptions, acute or chronic, and the suppression of an habitual discharge, have frequently a decided influence in developing this disorder, as well as many others.

Symptoms and progress. This disease in most instances succeeds a severe attack of the acute catarrh;—the cough and expectoration continuing after the fever has altogether subsided; or the fever continuing in so slight a degree as only to be perceptible towards evening, or merely during an increase of the complaint. The appetite and strength return, but the patient commonly loses a little flesh, and remains paler than usual. During repose, there is no oppression on the chest, but exercise soon brings on dyspnœa. Sometimes after continuing several months, or even one or two years, the disease gradually and entirely passes off. This more particularly happens in young subjects. More commonly, however, the cough and expectoration diminish, or entirely disappear, during summer only, and re-appear in winter. In this case, in the intervals of obvious disease, there still remains that variety of the complaint which will afterwards be described under the name of the dry latent catarrh. The return of the complaint in winter is frequently attended by fever, particularly if the expectoration is copious; and after several renewals of this kind, it terminates in a continued mucous catarrh. In this state, the pulse and heat of skin remain for the most part natural, notwithstanding the great expectoration which weakens and emaciates the patient. In some rare cases, hectic fever comes on, with rapid emaciation, and the disease terminates fatally with all the usual symptoms of phthisis pulmonalis.* In fact, the most perfect similarity exists between the two diseases, as far as regards the expectoration, the emaciation, and all the other general symptoms. Percussion in this case cannot remove the difficulty, as the chest sounds quite well in many consumptive patients. The indications afforded by the stethoscope are much more to be depended on. In such cases, if, upon properly examining a patient, at different hours, and for a certain length of time, we find neither pectoriloquy, nor the guggling produced by softened tubercles, nor the *cavernous respiration* of tuberculous excavations; nor the permanent absence of respiration in certain places from tuberculous indurations of some extent, we have a strong presumption that the disease is merely chronic catarrh; and if the same results uniformly present themselves after an attendance of some time, (say two or three months,) our presumption is converted into certainty. In these cases, the stethoscope gives no other signs than a mucous rhonchus, sometimes indeed pretty loud and abundant, but very rarely continuous, and still more rarely general over the chest. Very commonly we can hear distinctly the round of respiration notwithstanding the rhonchus; and there is hardly ever observed that total suspension of respiration which occurs in the acute disease, unless indeed there should happen to co-exist with the chronic, a dry or pituitous catarrh, with intense congestion of some portion of the mucous membrane. It even frequently happens that the respiration becomes puerile over nearly the whole lungs, in these chronic catarrhs, while, at the same time, there exists a continual dyspnœa, occasionally aggravated to violent paroxysms, even in a state of quietude. This constitutes the humid asthma of practitioners.

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* A remarkable case of this kind is given by Andral, tom. ii. obs. 17.—*Author.*

Treatment. The treatment most in use for this complaint, particularly that of old persons, consists in the establishment of a permanent drain in the arm or thigh, and the use of certain aromatic bitters, or of other plants nearly inert, such as hyssop, horehound, ground-ivy, sage, veronica, &c. If the expectoration is suspended, the oxymel of squills, or kermes mineral, in small doses, is prescribed; and if the cough becomes hard, and returns

* See Bayle's *Recherches sur la Phthisie*, p. 75, and cases 48 and 49.—*Author.*

by fits, some slight paregorics are ordered. This kind of treatment is simply expectant; although it is applied to a chronic disease, which far from tending naturally towards a cure, grows worse in proportion as it becomes ancient, and as the age of the subject increases.

It must be admitted that there are cases, in which the long continuance of the disease, and the age and debility of the patients, afford slight grounds for hope from a more active mode of treatment; but there are many others, on the other hand, in which the practitioner too soon despairs of success, and consequently renounces the use of means which are really efficacious. Among these means, there is no one more frequently useful than emetics, repeated according to the patient's strength and his power of supporting their action. I have cured, in this way, catarrhs of very long standing in old persons, and still more in adults and children. In the case of an old lady of eighty-five, who had laboured under a chronic catarrh for eighteen months, with an expectoration amounting to two pounds daily, I prescribed fifteen emetics in one month, and with complete success, as the patient lived eight years afterwards free from the complaint. After the use of emetics, tonics given in small doses are often useful, such as the bark, and other bitters, and preparations of iron: these frequently carry off the remains of the complaint entirely, or greatly moderate it.

Spirituous preparations, and particularly punch, sometimes succeed perfectly in the same case; but it is necessary to continue their use much longer than in the acute disease. The balsams are frequently equally beneficial, when the stomach will bear them; but they must be given in a larger dose than is usual. The balsams of tolu and capaiba, as also turpentine, should be given in a dose of from eighteen to thirty-six drops daily, and sometimes in still larger quantity. The internal use of tar water, as the ordinary drink, has sometimes proved successful, as has also the inhalation of the fumes of this substance either simply or mixed with water, diffused in the patient's chamber.[*]

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[*] The attention of practitioners in this country was, a few years since, more particularly called to the use of the balsam of copaiba, in chronic inflammation of the bronchi, by Dr. Armstrong. In his work on Scarlet Fever, &c. page 271, 2nd. ed. he speaks highly of its beneficial effects in this disease. He says, that it seems to exert a specific influence over the mucous membrane of the bronchi, obviously and quickly lessening, in many cases, the expectoration, cough, and irritation. He however recommends it in much larger quantity than even our author, viz. in doses of about thirty or forty drops three times a day, and gradually increased afterwards, until sixty, eighty, or more drops be taken at each time. I am sorry to say that I have not derived the same benefit from the use of this medicine. My own experience accords more nearly with that of Dr. Hastings, as stated in his work on the inflammation of the mucous membrane of the lungs, page 304. "Whenever there is much fever," says Dr. H., "it appears to be increased by this remedy, and it does not always allay the cough or alter the expectoration. It frequently disagrees

When an acute catarrh supervenes to the chronic disease, we are sometimes obliged to have recourse to the means already no-

with the stomach, when given in sufficient doses to benefit the pectoral symptoms, and sometimes a diarrhœa comes on under its use. Occasionally it produces all these troublesome effects without relieving the cough." A circumstance, not much noticed by these writers, and which renders all such plans of treatment nugatory, is the frequent co-existence, especially in old persons, of a similar condition of the mucous membrane of the upper portions of the alimentary canal. In this complication every thing stimulating, whether as food or medicine, is decidedly injurious; while the most remarkable benefit is derived from such mild regimen as the obvious condition of the membrane indicates. This is not the place to inquire into the rationale of symptoms in such cases, or whether the affection of either of the two portions of the same membrane—the pulmonary and gastric—can be considered as the cause of the other: it is sufficient for our present purpose to be assured of the fact of the co-existence; and it is highly necessary to keep it in mind in our practice. See Dr. Fothergill's paper on the use of balsams, vol. ii. p. 115.

The inhalation of watery, and also resinous vapours in diseases of the lungs is of very ancient date. In Bennet's *Theatrum Tabidorum*, we find an account of cases treated in this manner, together with delineations of the fumigating apparatus, and receipts for the materials used. See chap. xxviii. *De halituum et suffituum administratione.* Mr. Mudge, in the work formerly quoted, page 80, mentions a case of apparent consumption, wherein much benefit was derived from the inhalation of the vapour of resin. But it is to Sir Alexander Crichton that we are indebted for the introduction of the vapour of boiling tar as a remedial agent. This author first called the attention of English practitioners to the employment of tar vapour as a cure for *consumption*, in a small pamphlet, published in 1817; and endeavoured to impress the practice more particularly on their notice by a larger work "On the treatment and cure of several varieties of consumption," in 1823. In our present state of improved knowledge respecting the pathology of phthisis pulmonalis, it is hardly necessary to say that the proposal to cure *this disease* by such means would now appear idle. It no doubt originated from false and fallacious experience, supported by the well known difficulty of discriminating certain cases of chronic bronchitis from true phthisis. A severe examination of all the trials made with this agent, including even those recorded by Sir A. Crichton himself, lead to the conclusion that it is in chronic catarrh or bronchitis only, that this practice has been at all beneficial. Its indiscriminate employment has proved it, as might have been anticipated to be, injurious in true phthisis, while its limited use has certainly been beneficial in many cases of the chronic mucous catarrh. Dr. Hastings says, that in this disease it seems to assist other remedies in restoring the mucous membrane to its healthy secretion; and in some very obstinate cases the inhalation alone has appeared to remove the diseased action in it. He adds, however, that in other instances the inflammation has been aggravated and rendered more acute by it. He sums up the result of his experience of this remedy in chronic catarrh in the following words: "When the habit of body is irritable, and the inflammation at all active, the symptoms are increased by its use; but if the disease has been long in a chronic state, and the habit of body be not irritable, relief follows its application." Op. Cit. p. 309.

In a valuable paper by Dr. James Forbes, published in the Medical and Physical Journal for October, 1822, there is an interesting report of the results obtained from the use of tar vapour in one of the military hospitals. It is there stated that, while of nineteen cases of phthisis, it produced bad effects in eleven, and no effect in eight; of thirty-two cases of chronic catarrh, it produced a cure in eight, an improvement in six, no effect in eighteen, and bad effects in none. This may perhaps be considered as a fair average of its probable effects in this disease.—*Transl.*

A new mode of treating chronic catarrh has lately been proposed by M. Gannal, viz., the inhalation of chlorine gas. When used with the requisite caution, this treatment is productive of none of the inconveniencies that might be expected from it at first sight: it neither excites cough nor increases dyspnœa, nor gives rise to any pain in the chest, and indeed seems to act merely by modifying, in a greater or less degree, the characteristic secretion of the bronchial membrane, which gradually ticed when treating of the former, particularly blisters, cupping, and other derivatives; but in the simply chronic affection I have never found either blisters or issues of any benefit. On the contrary, in this, as in many other chronic complaints, I am convinced these are only one more evil in addition to those already existing. It would no doubt be imprudent to suppress a drain of this kind when it has existed for several years; but I must think that it is not only prudent but humane to prevent these from acquiring over the system the force of an habitual discharge, when it is ascertained that they have been productive of no benefit after a fair trial. When the dyspnœa becomes extreme, narcotics, particularly the recently prepared powder of belladonna or stramonium, in doses of half a grain to a grain, afford most relief. Their administration is frequently followed by the speedy but temporary cessation of the dyspnœa.* If the expectoration diminishes or is altogether suspended by the conversion of the disease into the dry catarrh, a circumstance likely to happen on the occurrence of a fresh cold, the membrane becomes usually more tumefied, and the dyspnœa is consequently increased. In these cases an emetic is of the most service; and when the dyspnœa is less intense, squill, ipecacuan and kermes given in small doses. Should this state, however, continue for some time, we must have recourse to the means which will be indicated when we come to speak of the dry catarrh.†

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disappears under its use. As chlorine thus applied is unquestionably an irritant to the mucous membrane, it probably produces its good effects by substituting one inflammation for another. The following is the mode of administering this remedy: The apparatus may be either a Wolff's bottle or simply a wide-mouthed bottle having its cork traversed by two glass tubes disposed as in Wolff's apparatus; into this, a small portion of water is poured sufficient for the immersion of the extremity of one of the tubes to the extent of nearly an inch; and when this water is raised to nearly the temperature of 90° a few drops of liquid chlorine is added; this chlorine is vaporised along with the warm water, and is inhaled by the other tube along with the watery vapour and the air which flows in through the longer tube. The flask must be at least half-pint size, otherwise the small portion of water which it would contain would cool too soon, and the chlorine gas would not be mixed with a sufficient quantity of watery vapour. The tubes ought to be from four to six lines wide: as. if smaller, respiration would be fatiguing. The chlorine should be extremely pure, and at first we ought not to use more than six drops at a time; an additional drop may be used at every subsequent trial, until the dose is strong enough to produce some uneasiness in the chest: when this occurs, we immediately return to the six-drop dose, and ascend progressively as before. It is quite essential that the application be repeated at least six or eight times daily.—(*M. L.*)

* If at this period of relief we explore the respiration by the stethoscope, we find it the same as during the paroxysm, a proof that the benefit obtained consists simply in the diminution of the necessity of respiration.—*Author.*

† A medicine unnoticed by our author, but which has been pretty extensively employed in this country of late years, in chronic catarrh, is colchicum. Like the balsams, it is a very uncertain remedy, and like them is inapplicable if not injurious in many cases. Like them, however, it is also occasionally useful, and ought not to be neglected by the judicious practitioner. The following is the account given of it by Dr. Hastings: " It allays the cough, promotes the flow of urine, and keeps up a regular alvine discharge. It can be given much more generally than squills, because it does not produce that feverishness which results from the use of the latter remedy, and can therefore be employed where there is considerable fever. The dose

SECT. III.—*Of the pituitous catarrh.*

I give this name to that variety of catarrh in which the expectoration is colourless, transparent, ropy, frothy on the surface, and underneath like white of egg diluted with water. It has been already stated that this kind of expectoration commonly appears at the onset of catarrh, but then only in small quantity; and it sometimes re-appears towards the close of the disease. It is frequently intermixed with the denser sputa of the chronic mucous catarrh, particularly when this is aggravated into an acute character. It also occurs occasionally during the resolution of peripneumony, and in the œdema of the lungs. In all these cases, this species of expectoration exists only temporarily, for a few days or weeks at most; but there are two others in which it assumes a very slow progress. The first of these I shall denominate the idiopathic pituitous catarrh; the second co-exists with an accumulation of miliary tubercles in the lungs.

Idiopathic pituitous catarrh. The anatomical characters of this affection are a middling degree of swelling and a slight softening of the mucous membrane, with a slight appearance of redness here and there. It may, therefore, be considered as occupying

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generally prescribed is twenty drops (of the tincture) three times a day. In some cases this must be diminished on account of its action on the bowels. If there be much quickness of pulse the author generally adds eight or ten drops of the tincture of foxglove, from which combination the cough is often relieved and the quickness of the pulse diminished." Op. Cit. p. 303.

As it is to the chronic mucous catarrh that the greater number of the cases denominated *humoral asthma*, and also the disease described under the name of *habitual asthma*, must be referred, the English reader will consider the preceding observations as applicable to these affections. In reference to the cases denominated *habitual asthma*, the scientific and highly ingenious mode of treating these by galvanism, introduced by Dr. Wilson Philip, deserves some notice in this place. For a particular account of this practice I refer the reader to the author's "Experimental Inquiry into the Laws of the Vital Functions." 2nd Ed. p. 331.

If the advantages of this mode of treatment shall be found as striking in the hands of other practitioners, on future trials, as they have been in those of Dr. Philip, it must be considered rather discreditable to the profession, that such trials have been so long and so generally delayed. In this case, as in that of mediate auscultation, it is probable that the *trouble* requisite for the application of the means, is the principal cause of their not being applied. Indolence is a potent and prevailing advocate, even with the most active. We readily persuade ourselves that what is very troublesome to do, may be left undone, with little detriment to ourselves or others; and that an easy substitute is an adequate substitute. If the mere feeling the skin could convey a galvanic shock, or the simple listening to the breathing could stand in place of mediate auscultation, we should, I suspect, have no reason to complain of the neglect of these two important measures, in practice. I wish, in the present case, as well as others, I could plead less guilty to the charge of professional indolence. Several years since, I certainly did try galvanism in a few cases of chronic mucous catarrh, in the persons of Cornish miners; and the results, as far as they went, were both interesting and satisfactory. In these trials, which were only repeated two or three times, the breathing was temporarily improved, and the quantity of mucus in the bronchi diminished under the immediate action of the galvanism, as was proved by the diminution of the mucous rhonchus under the stethoscope.—*Transl.*

the limits between the serous and sanguineous congestions, and as belonging rather to the former than the latter.

The signs of this affection are the following: the expectoration is as above described; the chest sounds well on percussion; the sound of respiration is weaker during the fits of coughing than in the intervals, but is seldom altogether suspended in certain points of the chest; it is attended by a sonorous rhonchus, flat or sibilous, imitating the chirping of birds, the note of a violoncello, or the cooing of the wood-pigeon. With this there is frequently intermixed a mucous rhonchus, but this conveys the impression of being produced by a thinner fluid than the mucus of the common catarrh. In the intervals of the attacks, these various rhonchi exist, but in a much less degree; and sometimes there is only perceptible a very slight dull whistling, extending over the whole bronchi, unlike the partial and acute sound which constitutes the sibilous rhonchus properly so called. (This variety of the phenomenon may be denominated *subsibilant respiration.*) The respiratory sound is louder than during the paroxysms; sometimes it is almost puerile. If the complaint has been of long standing, and has already occasioned dilatation of the bronchi, the respiration assumes more or less the character of the variety called bronchial. In all cases it varies in intensity in different points of the chest, and these points vary from day to day.

This disease may be either acute or chronic. *The acute pituitous catarrh* constitutes one of the severest species of the suffocative catarrh. It is characterized by an extreme oppression attended by a copious pituitous expectoration. It sometimes begins as a common cold; but after a few hours, or even minutes, its severe character is soon declared by the violence of the cough, the intensity of the dyspnœa and oppression, the lividity of the face, marks of cerebral congestion, disordered circulation, and coldness of the extremities. In children it is sometimes mistaken for croup. I had occasion to know a case of this kind lately, where, on examining the body after death, we found the bronchi hardly at all red, but nearly filled with a serous fluid, which was somewhat viscid and slightly frothy.

The stethoscopic signs of this affection are the varieties of rhonchus already noticed. To these may be added the occasional presence of a crepitous rhonchus, produced by a certain degree of œdema of the lungs co-existing with the serous discharge. The chest sounds well on percussion.

These attacks, however violent, are usually transient. In certain cases they are recurrent. A remarkable instance of this is given by Bree, of a woman attacked in perfect health with a paroxysm of the kind described, passing entirely off after a few hours, and returning in the same manner, and with extreme violence, after an interval of six months. In the second attack this patient expectorated four pints of a frothy serum slightly tinged with blood.

Transient pulmonary fluxes of this kind may be regarded as critical and as one of the modes whereby nature seeks to get rid of some morbific cause, which may or may not be perceptible to us. Accordingly, we occasionally see affections of the kind just noticed, and, yet more frequently, serous vomitings or purgings, of an analogous kind, followed, in a few days or even hours, by the dispersion of an anasarca, an ascites, or hydrothorax.

I shall notice the treatment of these acute pulmonary fluxes when I come to notice the suffocative catarrh.

The *chronic pituitous catarrh* occurs only in advanced life, and more particularly attacks those whose constitutions have been debilitated by excesses, or by sedentary habits. It is common in gouty subjects in whom the gout has lost its regular form, and becomes less strongly marked. It is also the consequence of frequently repeated attacks of the acute mucous catarrh. The chronic variety never succeeds the acute species which we have just described. It usually comes on by slow degrees, after repeated attacks of the acute mucous or dry catarrh. When the pituitous discharge is once fully established, it becomes frequently intermittent, and often with considerable regularity. There are usually two paroxysms of cough and expectoration in the twenty-four hours, the one on waking from sleep, the other in the evening; but sometimes the paroxysms immediately follow the patient's meals. The quantity of fluid expectorated is always very great: I have known some patients discharge, in the course of one or two hours, from two to three pounds.*

During the attack there is always dyspnœa, which either diminishes or passes off with it. When this disease has existed some time, the countenance assumes a pale blueish tint, and the body becomes considerably but not extremely emaciated. The patient's constitution becomes more lymphatic; the blood grows thinner, and when drawn from the veins exhibits a very weak coagulum. The patient nevertheless continues fit for many avocations, and can be considered only as an invalid. In this state the complaint may exist a great many years; but as age advances, the fits become longer and more frequent, the dyspnœa becomes habitual, and the disorder then acquires the name of ***asthma***. The usual termination of it is by the supervention of œdema of the lungs, and finally suffocation from inability to expectorate.

It is singular how many years patients will survive under the immense discharge produced by this disorder. M. Alard mentions some interesting examples of this kind; and I myself am acquainted with two old gentlemen, whose cases may be added to the number. One of these, who is upwards of seventy, has expectorated during the last ten or twelve years, in two daily paroxysms, about four pounds of a colourless, ropy, and frothy fluid. The other brings up every morning, by gentle spontaneous vomitings, repeated at short intervals during several hours, from three to six pounds of a liquid exactly like white of egg mixed with a third part of water. This gentleman is upwards of sixty, enjoys tolerable health, and walks several hours every day. Some patients, however, die of exhaustion within a much shorter period, and from a much smaller discharge. Two cases of this kind are given by M. Andral:—the one, an old man, carried off after five months, by the daily expectoration of about two pints of a serous fluid;—and the other, a person of forty-five years of age, who died after bringing up three pints of the same kind every day, during three successive years. In neither of these cases was there found any other cause of death; and in the one last mentioned, the mucous membrane of the bronchi was found extremely pale:* so true it is, that besides the light, no doubt very great, thrown by morbid anatomy on the causes of these diseases, we must, in certain cases, look elsewhere for information.

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* It has been, no doubt, the suddenness and transient nature of these fluxes which have led Junker and Salmuth to give them the name of *phlegmatorrhagies*, which has been since applied by M. Alard to similar discharges from the mucous membrane of the stomach, bowels, uterus, &c. (*Du Siege et de la Nature des Maladies*, tom. ii. Paris, 1821.) I would propose *phlegmorrhagy* as a term at once more easily pronounced, and more conformable to the analogy of medical nomenclature.—*Author*.

It is rare that we meet with *idiopathic* cases of this disorder so well marked as those just noticed; but it often exists in a high degree as a consequence of the simultaneous development and persistence of a great number of miliary tubercles in the lungs. These pituitous discharges were indeed considered by Bayle as the pathognomonic sign of this variety of phthisis.† The *symptomatic* pituitous discharges are marked by less regular fits of coughing, and they present, moreover, particular signs, depending on their organic cause, which will be noticed when we come to treat of phthisis.

Treatment. The idiopathic pituitous catarrh, when it has become habitual, may be considered as little, if at all, under the influence of medicine. On this account, when the mucous or dry catarrhs are complicated with this affection, we must endeavour to remove all traces of these. The means recommended against the chronic mucous catarrh, particularly emetics, are often beneficial in this case; the balsams are less so, and ought not to be employed, unless the disease has become entirely chronic. Blisters applied first on the chest, and subsequently on the extremities, are of more use here than in the mucous catarrh. The same is true of opium given in small doses frequently repeated.‡

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* Op. Cit. Obs. xiv. and xvi.

† Recherches sur la Phthisie.

‡ The chronic pituitous catarrh from its obstinacy seems to demand more than any of the other kinds, a topical treatment; and it is in it that the chlorine gas would seem to promise most effectual relief. I have found great benefit from it in one case.—(*M. L.*)

near the part affected, of augmenting in place of lessening the congestion, the blister applied to the chest has the additional disadvantage of impeding the thoracic movements, at the very time when the full extent of inspiration is requisite to prevent suffocation. I have never found bleeding indicated in the suffocative catarrhs of children, or in the few cases of the same affection which I have met with in adults. I am of opinion, however, that it may sometimes be advantageous in individuals of a sanguine constitution. The loss of blood favours absorption, and diminishes, at least for a time, the greater number of the secretions and exhalations. In this respect it may be useful in such cases; but if carried too far there is reason to fear that it may so debilitate the patient as not only to check expectoration, but even so much weaken the muscles of inspiration, as to incapacitate them for the increased labour which they have to perform.* We must likewise endeavour to diminish the necessity of respiration by administering paregorics, among which I give the preference to the powdered root of belladonna, in the dose of half a grain or a grain, repeated at such intervals as the severity of the suffocation and the patient's strength seem to require.

In two cases I employed no other means than the emetic tartar, given in large doses, as will hereafter be particularly described in the chapter on pneumonia. In one case the catarrh was complicated with œdema of the lungs. The other was a woman twenty-four years of age, of a robust constitution; this patient, although apparently almost expiring when she came into the hospital, was out of danger in twelve hours. The other patient also recovered, but more slowly.†

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* This is evidently written under the influence of strong prejudice. It cannot be questioned that bloodletting, and particularly local bloodletting, is indicated in the true suffocative catarrh, and the relief afforded by it is so speedy and complete, that it is very unlikely that it should be carried too far. The dread of weakening the patient so as to check the expectoration, is quite visionary, since we know *that* the violence of the dyspnœa arises much more from the tumefaction of the bronchial membrane, than from the amount of the bronchial secretion. Leeches, in large numbers, or, still better, cupping on the chest, with counter-irritation by means of blisters, and sinapisms on the lower extremities, will always be found the most effectual method of treating the suffocative catarrh of children and adults. —(*M. L.*)

In the justness of the above remark I entirely concur. —*Transl.*

† I am of opinion that our author, in the four preceding sections, has conveyed to the reader a general impression of less severity in the diseases treated of, than the inflammation of the mucous membrane of the bronchi often exhibits. And if this be so, I suspect that the cause will be found in his determination to describe the affections under the name *catarrh* and not *bronchitis*. I think the impression would have been more clear and forcible, although the delineation might not have been at all more accurate, had bronchitis been taken as the genus, and the varieties of catarrh above described given as species of this. It is no doubt true, as remarked by the author, that catarrh frequently forms the shade between inflammation and congestion, and that in certain cases of catarrh it is very doubtful if there is really any inflammation of the mucous membrane. But it is equally true, that very unequivocal and violent inflammations of this membrane *do* exist, exclusively of

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The expression *dry catarrh* involves a contradiction if we look to etymology, since the word catarrh denotes a flux or discharge; but as this phrase has been used by the moderns, I shall employ it in this place to designate those inflammations of the bronchi which are attended with little or no expectoration. This affection is extremely common in the chronic state. In the acute state it exists at the commencement and also at the close of a common cold; but in this last case, it is accompanied by a pituitous catarrh, which appears to have its seat in a different part of the mucous membrane. It frequently exists, also, in an entirely latent state, in continued fevers.

The chronic dry catarrh is most usually an idiopathic affection. It is frequent in gouty and hypochondriacal subjects, in persons affected with cutaneous eruptions, and in those whose constitutions are broken down by excesses of any kind It frequently exists in a slight degree in individuals who are otherwise in very good health. Almost all the inhabitants of cold sea coasts and damp vallies, are perpetually attacked with it in some degree or other; and even in the driest parts of France, in one half at least of persons arrived at adult age, and who are in other respects in perfectly good health, the stethoscope detects the traces of a slight habitual thickening or congestion, in some part or other of the mucous membrane of the lungs.

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those of the croupy or plastic kind. And the history of the disease delivered by our author, seems to me defective in not containing a distinct and separate account of this severe and highly inflammatory variety. The attention of the reader seems too much directed to the kind of secretion, and too little to the actual disease of the membrane, the cause of this. These remarks apply most forcibly to the affections described in the last section under the name of *suffocative catarrh*, which can only be considered as an accidental modification of the kinds previously described, and ought not, therefore, to have been noticed as constituting a distinct species. This, indeed, is admitted by the author himself in respect of all the varieties included under this title, except the last, the acute suffocative catarrh of adults and children. This variety of bronchitis has been noticed by many writers under different names. For a very complete history of all the varieties of bronchitis, and a pretty complete and accurate account of the opinions of preceding authors, I would refer to the work of Dr. Hastings formerly quoted, to Dr. Badham's Essay on Bronchitis, and to the second volume of Andral's Clinique Medicale. The disease described by Dr. Millar, ("Observations on the Asthma and on the Hooping Cough, by John Millar, M.D. 1769,") under the name of *Asthma*, and which occurred as an epidemic among children in the border counties of England and Scotland in the year 1755, was evidently that species of bronchitis, described by our author as the acute suffocative catarrh. Several well marked and well described cases of the suffocative catarrh, with the appearances on dissection, are detailed by the late Mr. Chevalier in the London Med. and Phys. Journal, vol. vii. and many valuable observations of a similar kind are scattered through the various periodical journals and transactions published in this country. See also two short but excellent papers by Dr. Williams, in the Cyclopædia of Practical Medicine, viz. the articles *Bronchitis* and *Catarrh*.—*Transl.*

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The anatomical characters, of this affection are—swelling, together with an obscure redness, or violet hue, of the mucous membrane. This swelling is particularly remarkable in the smaller branches, which are indeed sometimes almost completely obstructed by it. When the swelling is less, these branches are frequently blocked up by a very glutinous kind of matter, of the consistence of pitch, or somewhat firmer, disposed in globules of the size of hemp or millet seed. These globules, which are always free from air, are semi-transparent and of a pearl-grey colour; which colour is no doubt owing to an intermixture of a small portion of black pulmonary matter, as this occasionally shows itself more conspicuously in them under the form of small black points. This matter, which many persons, who do not consider themselves as having a cold, expectorate in small quantities every morning, has been called by Fourcroy *bronchial mucus.* I shall denominate it *pearly expectoration (sputa margaritacea)* to distinguish it from the pituitous and mucous kinds already described. Sometimes a portion of one of the larger bronchi exhibits over a space of only a few lines in extent, a swelling of its internal membrane sufficient to obstruct almost entirely the passage of the air, although in smaller branches of the same trunk it is much less tumefied. Andral has published two cases of this variety of the dry catarrh.* It is, however, much more common, as I have already stated, to find the membrane more swollen in the smaller branches. The dry catarrh is usually the more extensive the longer it has lasted; although even in young children we occasionally find the whole mucous membrane affected. When universal, or when only very extensive, it always gives rise to emphysema of the lungs.

The pathognomonic signs of this affection are—a perfect resonance of the chest, and a complete or nearly complete want of the natural sound of respiration in the parts actually affected. These parts change frequently, particularly when the disease is very general; so that those which at the first exploration gave no respiratory sound, may, after a few hours, give it more distinctly than any other, and *vice versa.* These variations are accounted for by the varying states of congestion in the mucous membrane, and by the varying secretion and expectoration of the pearly sputa. If the obstruction of the smaller bronchi is not very great, the respiration is still perceptible, but in a much feebler degree than might be expected from the resonance of the chest. Over the parts affected, we also distinguish a slight sibilous rhonchus, and more rarely, and only during a deep inspiration, a clicking like that of a small valve, occasioned, no doubt, by the displacement of the pearly sputa. The respiration continues natural in the parts of the lungs which remain sound, and rarely becomes puerile as in pleurisy or peripneumony: this last fact is explained by the very slow progress of the dry catarrh, which has gradually accustomed the patients to an imperfect degree of respiration, and prevented the necessity of the sound portions of the organ supplying the deficiencies of the diseased, by a preternatural energy of action. As the sound of the pulmonary respiration, properly so called, is nearly wanting in this affection, it might naturally be expected that the bronchial respiration would be occasionally perceptible in it. This, however, is never the case, according to my experience; and a full consideration of all the circumstances appears to render this occurrence very improbable if not impossible. The state of parts in this disease is extremely unfavourable for perceiving every kind of sound originating in the lungs. In the first place, the greater number of the air cells are habitually distended by the air, so that the pulmonary substance is rendered less dense, and thereby less fitted for the transmission of sound; and in the second place, many of the bronchial tubes, even those of considerable size, are habitually obstructed either by the swelling of their inner membrane, or by the glutinous matter secreted by it.

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* Op. Cit. obs. ii. and iii.

The habitual dry catarrh is sometimes, though rarely, complicated with the mucous or pituitous catarrh, acute or chronic. In this case we find the signs of each affection in different portions of the lungs; while the re-union of the three varieties is further proved by the simultaneous expectoration of their characteristic sputa—the pituitous, the mucous, and the pearly.

Symptoms and progress. This disease when existing in a middling degree, frequently remains altogether latent for a long course of years,—the subjects of it being no further conscious of its presence than by observing that they are shorter breathed than others, when they ascend a height or attempt to run. When the bronchial tumefaction becomes more extended, dyspnœa is then experienced, even in a state of quietude, and particularly after meals; and this state of oppression is referred by some patients to one side only, and sometimes to the side least affected After a time the dyspnœa comes on in fits which last usually several days, and are so severe as to merit and obtain the name of *asthma.* Towards the termination of these attacks, a cough comes on and the oppression becomes less; and after the cough has continued a few days the dyspnœa is still further relieved by the expectoration of some of the pearly sputa, intermixed with phlegm. In the slighter cases, these sputa lose their usual consistence and globular form, and become more copious, and feebly opaline from an intimate intermixture of a small quantity of an opaque yellowish or whitish mucus. At other times they are *vitriform*, and nearly of the consistence of the vitreous humour of the eye,—consituting, no doubt, the *glassy pituita* of the ancients. An expectoration of this kind is habitual with many persons affected with a slight degree of the dry catarrh; and as long as it continues they are never liable to attacks of asthma. Frequently this expectoration is in such small quantity that the patients are themselves unconscious either of it or the cough; in some persons there is in fact neither the one nor the other; and in many there is merely a slight cough perfectly dry, and perceptible only once daily, or once in two or three days. Coughs of this kind, when the dry catarrh of which they are the symptom has come on slowly and without being preceded by an acute affection, are usually denominated *nervous*. Too frequently indeed they are considered sympathetic, and the cause of them is sought for in some real or supposed affection of the stomach, liver, kidneys, or uterus. Hence the coughs called *gastric*, *hepatic*, *hysteric*, *&c.*; all of which are, in fact, examples of the co-existence of the dry catarrh with some affection of the particular organs indicated. Very commonly the cough ceases entirely during summer, and the oppression becomes less; no doubt because the increase of the cutaneous transpiration diminishes the gorged state of the bronchi and the secretion of the pearly sputa.

When a person subject to an habitual dry catarrh is attacked with an acute catarrh, this rarely goes through its regular course, so as to give rise to the copious mucous expectoration characteristic of it. On the contrary, it seems never to get beyond the first stage; but after a few days the cough becomes more frequent, and is attended by a slight pituitous expectoration, and a greater discharge than usual of pearly sputa of a thinner quality. Sometimes, indeed, their consistence is so much diminished, that they lose their rounded form and become diffluent; and in this state they exhibit a compound of the pearly and glassy sputa, and the yellow and viscid mucus of common catarrh, rendered opaque and greyish by the intermixture of much black pulmonary matter. The supervention of the acute catarrh usually brings on a fit of asthma, or at least aggravates the habitual dyspnœa. This is relieved by the appearance of the expectoration; but it frequently still continues worse than before the invasion of the new affection. If fever comes on in the course of the acute catarrh, it perceptibly lessens the oppression. The same is true of sleep; and if this ever comes on during an asthmatic paroxysm, the moment of awaking is the only one in which the patient fancies that he can breathe freely. Nevertheless, even during these intervals of ease, the respiration examined by the stethoscope, is not at all more perfect than during the severest paroxysms; a fact which proves that both fever and sleep act in this case by diminishing the necessity of respiration. The upright posture is not so constantly requisite in cases of asthma depending on the dry catarrh, as in oppressed breathing produced by diseases of the heart, or effusions into the chest. After an extensive dry catarrh has continued for a certain length of time, and more particularly if aggravated by repeated attacks of the acute kind above described, emphysema of the lungs supervenes, with its characteristic signs and symptoms. The name of *neglected cold* usually given to phthisis, is therefore applicable to this latter affection.

The dry catarrh is denominated *latent* when it is unattended either by cough or expectoration. This variety is distinguished by a very great and usually unequal feebleness of the respiratory sound, over the greater part of the chest; by the complete sonorousness of this cavity on percussion; and by the occasional though rare addition of a slight sibilous or obscure mucous rhonchus, or very feeble *sound of the valve:* these last signs are of such unfrequent occurrence that we may explore the chest several days successively without perceiving them. The dry catarrh is almost always latent, when slight and of small extent. It only then becomes an inconvenience when the tumefaction of the bronchi has increased sufficiently, either in extent or intensity, to impede the full development of the lungs required during exercise.

The symptomatic catarrh of fevers is almost always latent, particularly during the first days of the disease; not but that the patients, in this case, cough occasionally; but the cough is so slight and infrequent as to be either unattended to or altogether overlooked by the physician. It is sometimes, however, noticed by the attendants when unobserved by the practitioner. After continued fevers, and mucous catarrhs of long standing or frequently renewed, habitual latent dry catarrhs are left, which eventually terminate in the production of asthma and emphysema of the lungs.

The frequency of the dry catarrh, the insidious slowness of its progress, and the severity of its effects when arrived at its height, ought to convince us how necessary it is not to consider as unimportant affections, dry coughs of long standing, however slight or infrequent they may be. These coughs, as I have already said, are the consequence of the dry catarrh, except in the particular case wherein they are caused by the devolopment of miliary tubercles of the lungs.

Treatment. The means which are most useful in relieving the mucous catarrh, both acute and chronic, are without effect in the dry catarrh; or if of any use, it is merely by the removal of certain accidental symptoms or complications, after which the disease returns to its primitive state. In this way, blood-letting, either general or local, may be requisite in relieving a determination of blood to the lungs; emetics may be beneficial on the supervention of a fresh cold; while paregorics must frequently be had recourse to, as well to lessen the necessity of respiration, as to quiet severe fits of coughing. Opium repeated in very small doses, I find very efficacious in relieving this symptom, and the preparation I most commonly employ with this view, is the syrup of poppies, in doses of a tea-spoonful, and given to the extent of one or two ounces daily. The kermes mineral, as well as the other preparations of antimony, and also squills, have never appeared to me of any use in the dry catarrh, except in certain cases complicated with herpetic affections. The indications which naturally present themselves are—to relieve the vascular congestion or sub-inflammatory state, which exists habitually in the mucous membrane of the bronchi, and to facilitate the expectoration of the pearly sputa. In regard to the first indication, I have just stated that the detraction of blood is useless; derivatives, such as dry-cupping, particularly if the glasses are left long enough to cause vesication, blisters, emetics, and even purgatives, afford some slight but very temporary relief. Nevertheless, one is occasionally under the necessity of having recourse to some applications of this kind; and that which I prefer is a pitch plaster powdered with tartar emetic, applied between the shoulders.*

As to the second indication, the removal of the pearly sputa, it is evident that the glutinous tenacity of these is the chief obstacle to their ready expulsion; and I am of opinion that we possess means, if not infallible, at least often efficacious, in lessening this tenacity of the secretions and rendering them more liquid. This practice may perhaps seem to rest on the exploded humoral pathology, and I must confess that the theory of it is neither mine nor of this age. Sarcone† and Morgagni, after many others, made this theory one of the bases of their practice. I attach no value to it as a theory; but I can state from experience, that by means of those medicines which the chemical and humoral physicians of the last three centuries considered as proper to correct the tenacity of the fluids, I have succeeded in procuring very great and permanent relief to many indviduals who had long laboured under dry catarrhs of great severity. The means employed with this view are chiefly the milder or very dilute alkalies. Those I have been in the habit of using are the following:—1. Almond soap taken in the form of pill, with the patient's meals, to the amount of from half a drachm to a drachm daily. If the catarrh is complicated with spasm of the bronchi, (to be noticed hereafter,) I sometimes conjoin with the pills, the gum ammoniac, in the dose of from eight to twenty-four grains in the day. 2. The salt-water bath of the temperature from ninety-three to ninety-nine degrees of Fahrenheit; the artificial alkaline bath, with four ounces of the carbonate of potass or soda, and the sulphur baths, natural or artificial. I give the preference to the last in herpetic cases. 3. The internal use of the carbonates of soda, potass, or ammonia, in a dose of from twelve to thirty-six grains per day, diffused in all the patient's drink; or the sulphureous saline mineral waters, particularly of *Bonnes* and *Cauterets*.

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* The line of the spine must be avoided, on account of the excessive pain occasioned by the pustules in this place.—*Author.*

† Istoria ragionata de' Morbi, etc. Napoli, 1765.

The employment of these means ought to be persevered in for several months at least, even when they afford the most speedy relief. I have never observed any ill effects from them, and I have frequently employed the soap, more especially, for two or three years without intermission. A great many persons, who had already emphysema of the lungs, and either incessant dyspœna, or very frequent fits of asthma, have, to my own knowledge, been restored, under this kind of treatment, to a state of health so comfortable, that they hardly exhibited any signs of disease, and considered themselves as entirely cured. After the employment of these means for a certain period, the pearly sputa become more abundant; or if there had been previously no expectoration of the sort, this now takes place. At the same time the tenacity of the sputa is diminished; they become diffluent, and lose their rounded form; and relief of the oppression is experienced. This plan of treatment is often most efficacious where the disease is most severe. I know not what may be thought of the theory on which it is founded. Animal chemistry is yet too imperfect to furnish the solution of the problem.* No doubt it would be better if we could dispense with all theory; but this is impossible: the numerous and diverse facts which constitute the science of physic, can only be classed in the memory by the aid of some systematic bond, It is, indeed, much to be desired that less importance were attributed to views, which, after all, can only be considered as the scaffolding of the science; and more especially it is to be wished that the

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* The preceding section is one of the most interesting and valuable in the whole work. In it I think we have more insight into the true nature of one very numerous class of cases of asthma, than in all the voluminous writings of authors on this disease; while in the chapters on emphysema of the lungs and on nervous asthma, in a subsequent part of the treatise, we have such additional light thrown upon this disease, that it may henceforth, in a great measure, be considered as raised from the obscurity of hypothesis into the light of rational pathology. Once made acquainted with the existence of the disease described in the preceding section, and its common consequence, emphysema of the lungs, we perceive their applicability to the explanation of most of the phenomena of the different forms of asthma not dependent on disease of the heart. If the asthmatic attack itself is the immediate consequence of a spasmodic affection of the minute bronchi, and this, I think, can hardly be called in question—it must be admitted that the remote cause of the spasm, in a great many cases, is to be found in that condition of the bronchial membrane which constitutes the disease so admirably described by our author, in the preceding section; and I am convinced that a very great proportion of the fits of asthma, immediately owe their origin to exciting causes, which operate by aggravating the habitual state of disorder existing in the membrane. Of these causes, beyond comparison the most frequent is cold, or at least that class of agencies, which, in a different degree and in other circumstances, give rise, in healthy or delicate subjects, to the phenomena of catarrh. When we consider that this disease in fact habitually exists in these persons, keeping up a most unnatural sensibility in the affected parts to impressions from without, and when we consider, at the same time, how easily a part that is in a state of inflammatory irritation is excited to spasm, we need not be surprised at the facility with which the asthmatic paroxysms are excited by perceptible or imperceptible causes. Of these exciting causes, as I have already said, the impression of cold or at least the alternation of temperature, is that which reasoning would lead us to expect to be incomparably the most frequent, and which we accordingly find to be so in fact. A minute investigation of all the cir-

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cumstances attending the renewal of an asthmatic paroxysm, will convince any one of this, in a great majority of cases. I would add, that in *all* cases the exciting cause is, and in most cases can be traced to be, an irritant of some kind or other, acting on the too sensible membrane of the bronchi. This view of the pathology of the disease is supported by an examination of the facts recorded in all our best works on Asthma, particularly those of Floyer, Withers, Ryan and Bree. In the writings of the first and last named authors, who studied the complaint in their own persons, there is abundant evidence that the disease in them was a dry catarrh, and that the paroxysms, in a great majority of instances, were excited by cold. In the case of Dr. Bree this is more particularly evident. In the very sensible work of Dr. Ryan, the paramount influence of cold in exciting the disease, is established by many facts, and ingenious observations. The same influence is admirably illustrated in some cases detailed by the late Dr. Watt, in his work on Diabetes, &c. page 247, although a false explanation (I conceive) is given of the rationale of its operation in producing the asthmatic paroxysm.

As in every other case, a more correct pathology in this disease will put us in the way of a more rational practice. Instead of wasting our efforts in attempting to ward off paroxysms of a *purely* spasmodic nature, by measures directed to the nervous system, our attention will be directed to the removal of the real disease, the structural alteration and preternatural sensibility of the bronchial membrane. How far the attainment of the first of these two objects, the removing the structural alteration is within our power, I am not prepared to say; but I presume it cannot be considered as essential to the cure of the disease, since we know that this state may and does exist, in innumerable cases, and for a long period, without producing asthma. Neither shall I inquire, how far means which lessen the sensibility of the membrane, tend to restore the natural organization. I think, however, both reason and experience will bear us out in expecting more benefit from means that lessen the sensibility of the bronchial membrane, than from any other. And with this view, in addition to the measures recommended in the text, I would here beg leave to call the attention of practitioners most particularly to the use of the cold bath. This remedy was rarely recommended, and still more rarely used by practitioners, before the publication of Dr. Ryan's excellent work on asthma in 1793. In this work, the author adduces many instances of successful treatment by the cold bath, and recommends its adoption in very strong terms. Since Dr. Ryan's publication, this plan has been more frequently had recourse to, but much less so, I conceive, than it ought. Dr. Bree appears to have derived great benefit from it in his own case, and speaks very favourably of it as a remedy; yet, I think, he dwells much less upon its merits than it would appear to deserve, I have myself prescribed it with much benefit. Every practitioner must be well acquainted with the effect of cold bathing, in one form or other, in lessening the sensibility of the body generally, and the lungs in particular, to the impressions of cold. In my own experience, the effect of sponging the chest with cold water and salt or vinegar, once or twice a day, has proved of immense benefit to delicate subjects, and more especially to those liable to catarrhal affections, and to persons decidedly phthisical. In these cases, although, no doubt, the practice proves tonic to the system generally, I conceive its chief operation is in lessening the sensibility of the lungs to the impression of cold.

To the list of remedies mentioned in the text, there are two which ought to be added on account of the celebrity they have obtained in this country in the cure of asthma: I mean the oxyd of zinc and stramonium. For a full account of the operation of the former, I must refer the reader to the numerous cases treated by it and recorded in Dr. Withers's Treatise on the Asthma, published in 1786. In many of these, the remedy appears to have been efficacious; although, on the whole, I think the author has exaggerated its importance. For ampler details on the treatment of the different forms of asthma, I refer the reader to the article, *Asthma*, in the Cyclopædia of Practical Medicine, written by the translator of this treatise.—*Transl.*

attachment to theory would not lead many persons (as it does) to reject the very facts on which other theories, whether ancient or modern, hostile to their own, are founded.

Sect. VI.—*Of the convulsive catarrh or hooping-cough.*

This variety of the pulmonary catarrh has much engaged the attention of practitioners, as well on account of its frequency as its occasional severity. It holds the middle place between the pituitous and mucous catarrh, as far as regards the nature of the expectoration and the bronchial congestion, and it possesses, besides, some other characters peculiar to itself. It particularly attacks children, and seldom occurs twice in the same individual; hence, no doubt, the general belief of its contagious nature. The truth of this opinion is, however, far from being proved; and it is certain that the alternation of temperature is equally a cause of this as of other catarrhs. The cough in this affection returns by fits, which last a quarter of an hour or more. Each fit is composed of a quick succession of sonorous coughs, with scarcely any perceptible inspirations between; except that from time to time the expirations of coughing are suddenly interrupted by a very deep, seemingly convulsive and noisy inspiration, accompanied by a lengthened hissing, which constitutes the pathognomonic sign of this variety of catarrh. The face becomes swollen and livid in the paroxysm, and particularly before the sonorous inspiration. A colourless and scarcely frothy but ropy phlegm rather flows than is rejected from the mouth, after each paroxysm, while the patient leans forward to favour its escape. The paroxysms at first recur several times every day, being almost always more severe towards evening, but much less so during the night. After a certain time, they return only in the morning and evening, and towards the end of the disease, in the evening only. There is more of periodicity in this variety of catarrh than the others: before it goes off it sometimes assumes a tertian period. The duration of the hooping-cough varies from a few weeks to several months. Before it terminates, the paroxysms become shorter, lose their peculiar characters, and are attended by an expectoration more decidedly mucous. It is not, however, easy to recognize this alteration, on account of the habit of children to swallow the expectoration. Sometimes the disease degenerates into a chronic mucous catarrh, with emaciation and other symptoms resembling those of consumption. In the intervals of the paroxysms, the patient coughs but little, preserves his appetite and strength, and has rarely any fever except in the particular case just mentioned, or in the onset of a very severe attack.

The stethoscopic exploration of the chest in the intervals of the fits, supplies only the usual results of catarrh, namely,—a feebler respiration than natural, or the complete absence of this in certain points, which however sound well,—puerile respiration in other parts, and, occasionally, a slight sonorous or sibilous mucous rhonchus. During the fits, we can only perceive the shock communicated to the chest by the cough; or, at most, a slight degree of rhonchus, and also of the respiratory sound, in the brief intervals between the coughs; the natural sound of respiration, whether pulmonary or bronchial, being inaudible, even in those parts of the lungs, which, immediately before and after the paroxysm, give the puerile respiration.

The peculiar sonorous inspiration, pathognomonic of the affection, appears to have its seat exclusively in the larynx and trachea. The absence of the respiratory sound during the paroxysm, can only be explained by supposing a momentary congestion, from blood or serum, giving rise to a tumefaction of the mucous membrane sufficient to obstruct the bronchi, or by a spasmodic contraction of the same parts. The discovery made by Reissessen* of a circular muscular apparatus in the smaller bronchi, would satisfactorily account for a spasmodic stricture of these parts, which has been admitted in so many diseases of the lungs, by numerous authors, without further proof than that afforded by the symptoms. I must confess that I have in vain looked for the muscular apparatus described by Reissessen, in the smaller bronchial ramifications of the human subject; but their distinct existence in the branches of a larger caliber,—some facts already stated by me, and the phenomena of several of the varieties of asthma, lead me to regard as certain the possibility of the temporary occlusion, by spasmodic contraction, of the smaller bronchial ramifications. Be this as it may, I must remark, that the spasmodic character of the hooping-cough is sufficiently evident from the phenomena which occasionally show themselves in the glottis, larynx, and even in the pendulous veil of the palate. I formerly observed, that the extraordinary noises made by certain patients in breathing, or coughing, are owing to a spasmodic or voluntary contraction of the parts just mentioned. The same is true of the peculiar sounds which attend the hooping-cough; and also of those of certain cases of the dry catarrh, commonly denominated *nervous* or *gastric*. In both these affections I have met with patients who crowed like a cock, or barked like a dog. Dr. Bally lately sent me a patient with hooping-cough, in whom the paroxysms were accompanied by a cooing like that of a wood-pigeon, and sufficiently loud to be heard at fifty paces distant. This latter circumstance at once convinced me that the sound proceeded solely from the fauces, and was owing to a spasmodic contraction of the veil of the palate and sides of the glottis: an opinion the truth of which the application of the stethoscope at once demonstrated. This opinion was still further confirmed by the supervention, a few days afterwards, of a cynanche tonsillaris: the cooing disappeared during the continuance of the inflammation, and was renewed, but in a less degree, on its subsidence.[*]

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* De Fabrica Pulmonis. Berlin, 1822.

Treatment.—Bleeding is here as seldom useful as in the other varieties of catarrh. Mucilaginous and saccharine apozems are in this case, as in others, merely *expectant*, or at most soothing to the irritation produced by the cough in the fauces. There is one other way, however, in which they may exert a more powerful and direct effect on the disease. If the patient can be made to drink, by small and repeated portions, during the paroxysm, this is sensibly diminished both in severity and duration;—the effort of deglutition favouring and producing deeper inspirations, probably by counteracting the spasm of the bronchi.[†] No means are more useful, at the commencement of hooping-cough, than emetics, repeated every day or every second day, for one or two weeks. Children are well known to support this kind of treatment better than adults; and I even give the preference in their case, to emetic tartar over ipecacuan, as well on account of the great inequality of power in the latter, as because the former, on account of its solubility, is much more easily administered in doses proportioned to the exigency of the case. After emetics, narcotics in small doses are generally very beneficial. Much has been said, of late years, of the extract and recent powder of the belladonna; and I consider it to be superior to other plants of the same family. The dose is from an eighth to half a grain. Its efficacy in lessening the severity of the cough, and shortening the duration of the disease, may be accounted for in several ways: it lessens the necessity of respiration, and consequently dyspnœa, more certainly than any other narcotic; and it seems proper, like all the medicines of this class, to obviate the spasm of the bronchi, to diminish the irritation produced in these by the vascular congestion of their mucous membrane, and to lessen its augmented secretion. The extract of common daffodil (*narcissus pseudo-narcissus, L.*) and also the infusion of its petals, were proposed, some years since, as a sort of specific against this disease. I have used the extract much, and have occasionally seen it effect surprisingly rapid cures,—for instance, in five or six days; but this result is rare; and as a general remedy I find it much less efficacious than belladonna. The usual mode of administering the pseudo-narcissus, is to give half a grain, a grain, or two grains, every two, four, or six hours, according to the patient's strength. Its mode of action is yet imperfectly known. In a pretty large dose, it exerts a very conspicuous influence over the nervous system, and even produces convulsions. When the paroxysms of hooping-cough assume a periodical type, cinchona or the sulphate of quinine, given as in cases of ague, are often as efficacious as in this disease. I have seldom found blisters of much use. Autenrieth has proposed, as a substitute for these, the tartar emetic ointment applied in succession to different parts of the chest. I have occasionally found more benefit from this than from blisters. Frictions with oil, over the whole surface of the body, have been recommended as the principal means of treatment by Poutingon; and I have sometimes derived benefit from their employment. I have also seen good effects from these in certain cases of the chronic dry catarrh, where the disease was constantly aggravated by the supervention of acute attacks on the slightest alteration of the weather. This mode of increasing the cutaneous perspiration, which constituted so important a part in the hygeine of the ancients, has certainly been too much neglected by the moderns.*

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[*] The opinions of the numerous authors who have written on Hooping-Cough, respecting its cause, nature, and seat, are very various. The completest view that we have of these is given in the work of Desruelles, published in 1827; and to this and the Treatise of Dr. Watt, published in 1813, the reader is referred for much ampler details respecting the disease generally, than are to be found in the present work. Our author's account is especially defective in the history of the earliest and latest stages, as he neither notices the slight but important symptoms which usher in the more formal malady, nor yet traces its progress through the ulterior stages when it terminates fatally. This last point is particularly attended to in the work of Dr. Watt. The following is a brief synoptical view of the principal opinions promulgated by the moderns concerning the seat and nature of the hooping-cough, with the names of their chief supporters. It is proper, however, to remark, that several of the writers included under the same head, although agreeing generally as to the nature of the disease, sometimes advocate considerable and peculiar modifications of the common doctrine.

1. A nervous disease, according to the common acceptation of that term.—Cullen; Böhme; Guibert.
2. An idiopathic affection of the pulmonic and diaphragmatic nerves.—Hufeland; Jahn; Lobenstein; Albers; Wendt; Paldamus.
3. A nervous affection of the lungs, from sympathy with other organs, but chiefly with the stomach and bowels.—Stoll; Butter; Waldschmidt; Chambon; Danz(?).
4. A catarrh of the lungs and stomach. "Affection pneumogastrique pituiteuse."—Tourtelle.
5. The same, but conjoined with a spasmodic affection of the glottis and diaphragm.—Gardien; Millot.
6. Primary affection of the brain, exciting spasmodic affection of the respiratory apparatus.—Leroy; Boisseau; Webster; Otto; Begin.
7. Inflammation of the larynx and glottis.—Astruc; Dawson.
8. Primary bronchitis, or pulmonary catarrh, inducing directly spasm of some part of the respiratory apparatus.—Darwin; Watt; Marcus; Laennec; Brossais; Guersent; Dewees; Fourcade-Prunel; Duges.
9. Primary Bronchitis inducing cephilic irritation, and this in its turn exciting the spasmodic affection of the respiratory organs.—Desruelles.
10. Insects irritating the bronchial membrane.—Rosenstein; Linnæus.

Transl.

[†] It is well known that several species of animals, such as the tortoise, frog, &c., whose thorax is immovable, perform inspiration only by means of deglutition.—*Author.*

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* In the very brief notice of the treatment adapted to this disease, given by our author, many modes of practice, at least as beneficial as those mentioned, have been overlooked. Notwithstanding the condemnation of bleeding in the text, it is unquestionably very proper in many cases, and in some absolutely necessary. In directing its employment, which is indicated chiefly by the supervention of more formal inflammation in the bronchi or lungs, the stethoscope is of great use.

In a short but excellent article on this disease, by Dr. Johnson, of Dublin, in the Cyclopædia of Practical Medicine, the attention of the practitioner has been most

Sect. VII.—*Of symptomatic catarrhs.*

Pulmonary catarrh co-exists habitually with a great many affections of the pleura and lungs, and likewise with most diseases of a general nature, such as fevers of all kinds, gout, scurvy, &c.

A long and attentive observation of the phenomena of disease, both in the living and dead body, has led me to the conclusion which I am now about to state; and I am convinced that the repetition of the same means will lead others to the same results: nothing proves that the severest and most prolonged catarrh tends to produce any other affection of the chest, if we except (and this is of very rare occurrence) emphysema of the lungs and dila-

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judiciously called to the more important affections which complicate hooping-cough, as the points on which the event of the disease, at least in the severer cases, often hinges. The chief complications noticed by him are, peripneumony, gastric, or infantile remittent fever, and hydrocephalus. In each of these complications the treatment of the superadded disease is of much more importance than that of the primary hooping-cough. In these complications leeches to the head or chest, or præcordia, may be respectively most useful, as well as other kinds of treatment applicable in such cases. Many medicines supposed to possess a specific power in curing the disease have been recommended by various authors, and are still in constant use, either by practitioners or the vulgar. Some of these, if not all, have been found beneficial in various cases; and most of them may admit of a trial, without risk, in the latter stages of the disease, when no inflammatory complication exists. I copy the list as given by Dr. Johnson:—Opium, cicuta, belladonna, digitalis, bark, cupmoss, arsenic, nitrate of silver, assafœtida, castor, musk, artificial musk, camphor, oil of amber, meadow narcissus, the alkalies, antimony, cantharides, acetate of lead, cochineal. As the most important of all I would add, *change of air*. (See Dr. Clark's work on the Influence of Climate.)—*Transl.*

LITERATURE OF HOOPING-COUGH.

The following are the principal distinct works on hooping-cough, arranged nearly in the order of their publication. It is hardly necessary to remark, that the disease is also treated of in most of our general systematic works, and in the treatises on diseases of children. References to these, as well as to the multitude of *Theses* on Hooping Cough in the University Collections, and to the almost innumerable papers in the transactions of societies and the medical journals of different countries, would swell this notice to an inconvenient and disproportionate size. And I may take this opportunity of stating that the same remark applies to all the bibliographical notices in the present work.

1765. Williams (John.) Histories of wounds of the head, with remarks on the convulsive cough. *Falmouth*, 8vo.
1767. Fothergill (J., M.D.) Letter on the cure of chincough. *Lond.* (Med. Obs. & Inq. vol. iii.)
1769. Millar (John, M.D.) Observ. on the asthma and hooping cough. *Lond.* 8vo.
1770. Mellin (C. J.) Von dem keickhusten der kinder. *Frankf.* 8vo.
1773. Butter (W., M.D.) Treatise on the kinkcough. *Lond.* 8vo.
1774. Kirkland (Thos) Pertussis. Animadversions on the late treatise on kinkcough. *Lond.* 8vo. (anon.)
1776. Holdefreund (F. R. S.) Vom epidemischen stickhusten der kinder. *Helm.* 8vo.
1786. Hayes (Th.) A serious address on coughs, with obs. on hooping cough.—3rd Ed. *Lond.* 8vo.
1790. Meltzer (F. K.) Abhandlung vom keichhusten. *Leipz.* 8vo.

tation of the bronchi; whilst, on the other hand, there is scarcely a single disease of the lungs and pleura, which does not, from its very onset, give rise to cough and expectoration, in other words, to catarrh. The greater number of peripneumonies come on suddenly; some cases supervene to a catarrh, acute or chronic; but nothing is more uncommon than to see a peripneumony succeed to a catarrh of such severity as to lead us to attribute, with any degree of probability, the origin of the former to the extension of the inflammation from the mucous membrane. It is still rarer to witness the origin of pleurisy under these circumstances. On the other hand, there is scarcely any case of pleurisy or peripneumony, even latent, which is not accompanied, at least towards its close, with catarrhal expectoration. In the latter disease, more especially, this expectoration is sometimes so copious, and the catarrhal symptoms so strongly marked, as to mask the symptoms of peripneumony, in the apprehension of practitioners who are unacquainted with more precise signs of those affections. This complication constitutes the *peripneumonia notha* of Sydenham, the *angina bronchialis* of Stoll, and the *false fluxion on the chest* of the French practitioners of the last century.

Phthisis pulmonalis has been considered, even up to the present time, as a frequent consequence of pulmonary catarrh. Bayle was the first to attack this opinion. M. Broussais, who had supported it at a time when no one thought of calling its truth in question, still defends it.* This question is of sufficient impor-

1791. Danz (F. G. W.) Versuch einer allgemein. geschichte des keichhustens.—*Marb.* 8vo. (2nd Ed. 1802.)
1794. Jones (Gale.) Obs. on the nature and treatment of the hooping cough *Lond.* 8vo. (Brunonian.)
1798. Burton (J. M. B., M. D.) A treat. on the non-naturals, with an essay on chin cough. *York.* 8vo.
1805. Paldamus (V. H. L.) Der Stickhusten nach neuern ansichten bearbeitet. *Halle.* 8vo.
1808. Jahn (F.) Ueber den keichhusten. *Rudolst.* 8vo.
1809. Lando (V.) Memoria sopra la tosse in Genoa nell' anno 1806. *Genoa.* 8vo.
1811. Loebenstein-Loebel (E.) Erkenntniss und heilung der häutigen bräune, des keichhustens, &c. *Leipz.* 8vo.
1813. Watt (Rob., M.D.) A treatise on the chin cough. *Glasgow.* 8vo.
1813. Clossius (J.) Etwas ueber die quellen, &c. des keuchh. der kinder. *Hadam.* 8vo.
1815. Penada (Giac.) Memoria sulla tosse convulsiva. *Verona.* 8vo.
1816. Marcus (A. F.) Der keichhusten, ueber seine erkenntniss, &c. *Leipz.* 8vo.
1821. Id. Traité de la coqueluche. Trad. par E. L. Jacques. *Paris.* 8vo.
1822. Waterhouse (J.) On tussis convulsiva or whooping cough. *Boston.* 8vo.
1824. Peirson (A. L.) Medical dissertation on chin cough. *Salem.* 8vo.
1827. Desruelles (H.) Traité de la coqueluche. *Paris.* 8vo.
1813. Gardien. Dict. des Sc. Med. t. 6.
1823. Guersent. Dict. de Med. t. 6.
1830. Duges. Dict. de Med. et de Chir. Prat, t. 5.
1833. Johnson. Cyclopædia of Practical Med. vol. ii.
Willis. Sydenham. Morton. Cullen. Frank. Good.—*Transl.*

* I Chron. Paris, 1821.

tance to merit a particular investigation, and I shall return to it when treating of consumption. At present I shall content myself with observing, that we see a thousand instances of catarrh for one of phthisis; and that we hardly ever meet with a case of the latter disease which arrives at a fatal termination, without exhibiting, after the nature of it has become clear, an abundant catarrhal expectoration. Besides, this kind of expectoration constitutes always the greatest portion of the sputa of phthisical subjects.

One of the most interesting results with which auscultation has furnished me, is the constant presence of a catarrhal affection of the lungs, either latent or manifest, during the whole course of continued fevers. At the commencement, and most commonly through the whole period of the fever, the catarrh is latent, without cough or expectoration, and only to be discovered by the stethoscope. Sometimes it becomes manifest on the approach of a crisis; and indeed the crisis by expectoration, noticed by the ancients, and which I have myself had frequent occasions to remark, are neither more nor less than this catarrh. *Catarrhal fevers* are those in which the catarrh just stated to be inseparable from continued fevers, early unmasks itself, and gives rise to a copious mucous expectoration. The same term has also been applied to those violent catarrhs which are accompanied by a symptomatic fever; but in this case the fever, though considerable at first, and often of long continuance, soon loses the character of acute fevers, terminating long before the catarrhal affection, and never presents that combination of cerebral congestions and abdominal disorder, more or less severe, exhibited by true idiopathic fevers, which must be considered as diseases affecting at the same time a great many organs, and, perhaps, still more particularly the fluids. In eruptive fevers the pulmonary catarrh is equally constant, and most commonly in them it is manifest. In measles it is well known always to be so; and it continues often for a long time after this disorder is cured. The same thing occasionally takes place after simple continued fevers; but in these, I have also had frequent occasion to observe, that when a crisis takes place, at the very time when the lateritious sediment shows itself in the urine, every sign (even stethoscopic) of perhaps a very intense and extended catarrh disappears at once, with the coma, tympanitic affection, quick pulse, heat, and earthy character, of the skin. During the paroxysms of intermittent fevers, the stethoscope detects, in like manner, symptoms of catarrh, for the most part dry and latent, and of which some traces remain in the intervals. Even the fevers, which are most decidedly symptomatic, for instance, those arising from a wound, very commonly present the same phenomena. It would, therefore, seem, that the first effect of febrile action is to produce a congestion in the mucous membrane of the bronchi: and this effect is readily conceived on taking into consideration the energy of the actions of concentration and expansion which constitute fever.* The inflammatory fever of nosologists, that is, the fever characterised by a flushed countenance, moist and clean tongue, and a moist and moderately hot skin, is of all fevers that in which the marks of dry catarrh are the least perceptible. I have even observed two cases of this fever in which the sound of respiration through their whole course, was uniformly strong and *pure*, that is, unmixed with any kind of rhonchus, over the whole extent of the lungs. It may here be remarked, that this species of fever is of all the least liable to change into another form; that it is rarely accompanied by symptoms of any considerable degree of cerebral congestion; that it is hardly ever attended by signs of irritation, or by eruptions, or ulcerations of the mucous membrane of the intestines, or by a tympanitic state of the same; and, lastly, that it is almost the only fever in which the blood exhibits the inflammatory crust. In all these respects, then, the inflammatory fever appears to differ, either in its nature or cause, from other continued fevers; it is unquestionably the most simple of any, and can least of all be considered as a primary affection of the solids. Pulmonary catarrh is occasionally a striking symptom of pernicious remittent fevers. This appears to have been the case in the epidemic catarrhal fever of 1778, since we find a French

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* "Cet effet se conçoit facilement d'après l'energie des mouvement de concentration et d'expansion qui constituent la fievre." Although I have translated this paragraph, I cannot say that I quite understand it. The statement of facts immediately preceding it, is very intelligible, and of extreme importance, both in a pathological and practical point of view. The reader will not fail to observe, in many parts of this work, a very marked hostility to the doctrines of M. Broussais; and no doubt this discovery of the constant affection of the bronchial membrane in fever, is considered by our author as militating most powerfully against the exclusive doctrine of that pathologist. In a practical point of view, however, I only see in it a cause for extending the general principle of treatment advocated by Broussais.

I would be disposed to look upon Laennec's demonstration of the universal presence of bronchial congestion in fever as an additional argument in favour of the existence of a similar state of the mucous membrane of the stomach and intestines, and would deduce the practical conclusion from it, that we should also endeavour to relieve the former as well as the latter, by topical applications and the religious avoidance of all stimuli. The opinion of our author, that the congestion of the mucous membrane is the effect and not the cause of the *first* febrile movement, is certainly more tenable than the reverse; but the admission of its being the effect of the *first* movements, is almost equivalent, in a practical point of view, to the admission of its being the cause of these.

The investigations of the French pathologists leave no doubt as to the very frequent affection of the gastro-intestinal mucous membrane in fever; the facts just stated by Laennec equally demonstrate the affection of the mucous membrane of the lungs; may we not, therefore, presume, that many other parts of the system are in an analogous state? And, in reference to this opinion, may we not consider the state of the tongue (a mucous surface, and indeed a portion of the great intestinal mucous membrane) as an index of the existence of this affection of the mucous system, an [illegible] al.

Medical Society about this time giving it as a prize question,—"*To ascertain the relations of remittent catarrhal and pernicious fevers.*"*

Gouty persons are very subject to pulmonary catarrhs, particularly when the gout has ceased to be regular; and in them the disease puts on the character of the chronic mucous catarrh, and sometimes of the suffocative. Scurvy, chronic eruptive diseases, and in general all those affections wherein there exists a well-marked cachectic state, are often accompanied by a catarrh, either manifest or latent.

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CHAPTER II.

OF DILATATION OF THE BRONCHI.

THE organic lesion which I am now to notice, seems to have been hitherto entirely overlooked, both by the anatomist and the practitioner. This oversight is easily accounted for, from the circumstance of its generally occurring in a small portion of a bronchial tube, and of its being mistaken, when observed, for a larger branch. It can only be detected by tracing the individual bronchial tubes to their ultimate ramifications,—a thing which is rarely done in our examination of the lungs.

Anatomical characters. This disease presents itself in various forms. Sometimes it exists in one or in several branches, or even over almost the whole extent of one lung, without any other change in the appearance of the affected bronchi, than increase of volume: thus, ramifications which in the natural state would scarcely admit a fine probe, acquire a diameter equal to that of a crow-quill, or goose-quill, or even of the finger. These dilated branches frequently spring from a trunk of a much smaller diameter than their own. Occasionally we find the dilated branch resuming all at once its natural size; more commonly it appears to terminate in an irregularly shaped cul-de-sac, into which several small branches of a natural size are found to open. I have never observed a dilatation which seemed to exist in the ultimate division of the bronchi, and which could throw any light upon the manner in which these terminate. At other times, the dilated bronchi lose their natural shape, and present themselves under the form of a cavity, capable of containing a hemp-seed, a cherry-stone, an almond, or even a walnut. Several successive enlargements of this kind may exist in the course of the same tube. Sometimes the dilatation is confined to one or two branches in the upper lobe, and looks like a tuberculous excavation transformed into a fistula; frequently also, several continuous or contiguous branches, unequally dilated, and forming by their inter-communication a sort of burrow filled with puriform mucus, present, at first sight, the appearance of an anfractuous cavity of the same kind. These cases may occasion some difficulty, especially to an inexperienced anatomist. In the chapter on phthisis I shall point out the marks which will always distinguish the two affections, except in some very uncommon cases.

The density and consistence of the dilated tubes are extremely various. Most commonly the mucous membrane is from a quarter to a third of a line in thickness, uneven in its surface, softer than natural, and of a strong violet red colour, which is found to enter deep into its substance. The softness of the membrane is sometimes so great that we can separate it with the back or handle of the scalpel. Outside the mucous membrane there is an envelop nearly of the same thickness, white and very firm, consisting partly of a very dense cellular substance and partly of a fibrous tissue. The cartilaginous circles sometimes remain visible, but never the yellow muscular apparatus which distinguishes the sound bronchi. In the bronchial ramifications of a smaller order, the envelop above mentioned has here and there a cartilaginous texture; but in this case it ceases to retain its symmetrical form, and extends in different points more or less into the substance of the lungs. Sometimes this cartilaginous production occupies the greater part, or the whole of the space contained between the dilated bronchi; a remarkable example of which will be noticed at the end of this chapter. At other times the dilated bronchi are extremely thin, and hardly retain any trace of their original structure. In this state they are somewhat firmer than the healthy mucous membrane, very smooth internally, and usually red, but without obvious vascular injection. Sometimes their tenuity is such that they may be compared to the pellicle of an onion. I have never seen the whole course of the bronchi dilated in this manner; and the greatest of the partial enlargements which I have observed might have contained a walnut without its shell. These dilated bronchi with thin parietes, when first laid open by the scalpel, have a striking resemblance to the vesicular lungs of the class of animals denominated batrachia. This affection may exist in any part of the lungs, but is most common in the superior lobes. Ordinarily it exists in only a small number of the ramifications of the bronchi: sometimes, however, it extends to all the branches of one of the lobes. In this case, the dilatation is always greater (not relatively merely, but absolutely) in the smaller than in the larger ramifications, and greater in these latter than in the trunks whence they originate. The common trunks are rarely dilated, in any perceptible degree, even in the cases where some of their branches emulate them in diameter. When the dilatation of the bronchi is so great as this, the intermediate substance of the lung is flabby, void of air, evidently compressed, and, in short, resembling, in every respect, the same substance when compressed towards the spine, by an effusion of serous or purulent fluid into the cavity of the pleura.

When this lesion is slight, and affects only the smaller branches (in which it always commences,) it is easily mistaken during dissection. One thing which should call our attention to it is the observation of a puriform mucus flowing by drops from the smaller bronchi, upon cutting into the lungs.[*]

Occasional causes.—The dilatation of the bronchi is only met with in cases of chronic mucous catarrh. This single fact, coupled with what we know respecting the long continuance of mucous sputa in the spot where they have been secreted, enables us to conceive the mode in which the disease is formed. A temporary dilatation produced by a voluminous sputum, is rendered permanent by the constantly successive secretion of similar ones. In the present state of our knowledge, we are unable to explain why the bronchial tunics should in one case be thicker and in another thinner than natural, any more than we can explain the analogous diversity of volume which is produced in the walls of the heart by the same mechanical obstruction. The bronchial tubes which open into a tuberculous or gangrenous excavation, are commonly dilated, and continue so after the transformation of the cavity into a fistula. In this variety of dilatation, the bronchi almost always retain their cylindrical form; and this may perhaps be accounted for by the contents of the excavation not being permitted to remain long in them, but merely to traverse them under the impulse of an energetic cough. The same circumstance may explain the inferior frequency of occurrence, and likewise the slighter degree of dilatation, observed in the larger bronchi.[†]

Signs and symptoms.—The physical signs by which we can recognize dilatation of the bronchi, are pretty numerous, and vary according to the extent of the affection. When the whole of one lung is affected, percussion sometimes elicits a duller sound than natural, owing no doubt to the compression of the pulmonary substance; but this sign is seldom well marked in cases of simple dilatation. Over the seat of the principal dilatations, pectoriloquy more or less perfect is perceived; together with a *large* mucous rhonchus, precisely like the cavernous rhonchus of phthisis. And in the same places there exists the bronchial respiration, which an inexperienced observer may very readily confound with the puerile, on account of the intensity of the sound.

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[*] Andral, in accordance with the views of Laennec, gives the following summary of his observations on this affection. In some cases, the texture of the bronchial tubes is considerably thickened, the different anatomical elements which enter into their composition becoming more marked. In others, the dilated tubes are distinctly atrophied, their whole substance consisting of a very thin membrane, in which we can no longer trace either fibrous or cartilaginous tissue. We have, therefore, three different kinds of dilated bronchi, in regard to the anatomical constitution of their tunics:—1. Dilatation with a natural condition of the tunics; 2. Dilatation, with increased thickness of the tunics; 3. Dilatation with diminished thickness of the tunics. (Anat. Pathol. p. 500.) The same author informs us, that dilatation of the bronchi may be produced in a very short time, as is instanced, he conceives, in the case of infants who had never suffered from cough but during two or three months preceding their death. In these cases, however, M. Guersent is of opinion, that the dilatation is often congenital; and he thinks this view is corroborated by the comparatively greater frequency of this lesion in children than in adults, even in adults who have been long affected with habitual and severe coughs. (Dict. de Med. Art *Coqueluche*, t. vi. p. 12.)—*Transl.*

[†] Andral is of opinion that the varieties of dilatation which are accompanied by hypertrophy of the bronchial tunics, cannot be produced in the mechanical manner described by Laennec: the augmentation of the diameter of the tubes, he thinks, must be explained in the same manner as the augmented thickness of the tissue, both being the result of a vital hypertrophy. (Clin. Med. t. ii. p. 33.) The following explanation of the phenomena is given by M. Roche, (Dict. de Med. et de Chir. Prat. Art. *Bronchite*, t. iv. p. 263. *Paris*, 1830.) "We consider inflammation to be

The bronchial respiration becomes cavernous over the site of the greatest dilatations; and in those nearest the surface of the lungs, the cough and rattle assume also the cavernous character. In the same points, the voice, respiration, and cough, frequently yield the *veiled puff*, that is, a sensation as if a thin veil or wet membrane was only interposed between the column of air and the ear, and vibrated at each breath.*

Sometimes all these phenomena disappear for a time, particularly if existing in the lower parts of the lungs, owing to the accumulation of sputa, and re-appear after a copious expectoration or a change of posture. When the dilatation exists only in one point, the signs just mentioned are confined to that point, and are usually less strongly marked.

If the dilatation is moderate and nearly equal in several of the

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the undoubted cause of this lesion, and the following is the way in which it operates in producing it. By diminishing the cohesion of the tissues in which it is situated, the inflammation of the bronchi occasions them to yield under the pressure of the air during the violent fits of coughing; and the temporary dilatation, through frequent recurrence, at length becomes permanent. If the dilatation is produced slowly, which is the most common case, the tube still preserving a certain degree of resistance, becomes hypertrophied, like every other part excited to inordinate action. If, on the other hand, the dilatation is rapid, the tunics are extended beyond their natural elasticity, and having no power of reaction, become atrophied." This opinion is partially adopted by Dr. Williams, (Cyclopædia of Pract. Med. vol. i. Art. *Bronchitis*, p. 320,) but he reverses, in one respect, the cause and effect in the explanation of M. Roche. "The physical cause of dilatation of the bronchi," says Dr. Williams, "is to be found in acts of respiration and cough, exerting a degree of pressure on the softened membrane, greater than its elasticity can resist. Thus the forcible inspiration which succeeds each fit of coughing acts with greater effect on these weaker parts; and, again, the violent expiration of coughing brings an undue pressure on the same tubes, which, distended in one part, and partially obstructed by the thickening of their membrane in another, are perpetually exposed to a straining influence. Induration, the effect of another degree of the inflammatory process, sometimes succeeds, giving the dilated portions that rigidity that is occasionally noticed in them."

Dilatation of the bronchi is incidentally represented in the First Fasciculus of Dr. Carswell's Pathological Anatomy, (pl. i. fig. 4; pl. iv. fig. 4,) now in course of publication, and will be more completely illustrated in a future Fasciculus of this incomparable and invaluable work. See also fig. 50 and 52 of Dr. Hope's Illustrations of Morbid Anatomy.—*Transl.*

* This last sign may tend to show that the pulmonary substance has not become cartilaginous, in this point at least, and perhaps in others.—*Author.*

bronchi, there will be *diffused bronchophony* in place of pectoriloquy. When the dilatation is extensive, bronchophony and bronchial respiration exist over the whole space affected, and perfect pectoriloquy in some points only.

In cases even of the most extensive dilatation, the symptoms rarely indicate the severity of the disease. Most commonly there is neither fever (at least continued fever) nor emaciation; and if the patient is not obliged to undergo severe bodily labour, he is scarcely sensible of any diminution of strength. Even the respiration is not impeded, except under the influence of quick and rapidly renewed movements. The expectoration is not more characteristic. When the dilatation is very extensive, it is extremely copious. It is always mucous, but occasionally resembles the secretion in the last stage of the acute catarrh, and sometimes it is quite puriform. It is generally without smell, but occasionally has the odour of pus, of good or bad character. The secretion is sometimes so copious as to simulate the rupture of a vomica.

From the above account of the symptoms, it will appear that dilatation of the bronchi has many signs in common with other diseases, particularly with phthisis, peripneumony, and gangrenous excavations in the lungs; yet from the whole view of these signs and symptoms, an experienced practitioner can never have any difficulty in the diagnosis.[*]

Treatment.—This affection being only a consequence and a complication of the catarrh, it is evident that the only means we possess of restoring the bronchi to their natural size, is by diminishing the secretion of the mucous membrane. If there is any case wherein tonics, bitters, aromatics, and the balsams are beneficial, it is in this; and if there exists at the same time a cachectic state of the system, it will be well to combine with these, the preparations of steel and the medicines called antiscorbutic.

The dilatation of the bronchi, without being a very common affection, is, however, much less rare than I long conceived it to be. It is not unfrequently met with in children after hooping cough, and in old persons; and within these last six years I have met with a great many instances of it. Andral has recorded four examples of this affection, when existing partially.[†] I shall here give some account of two of these; and then subjoin four others, where the dilatation was more general. The two first of these four cases were communicated to me by M. Cayol. The two others are equally remarkable in respect of their anatomical characters; and the last one may perhaps be considered no less so, on account of the exactness with which the most minute circumstances of the state of the lungs were indicated by the stethoscope. M. Andral's first patient (obs. vi.) died of diseased heart. In this case there had existed, under the right clavicle and in the subspinal fossa of the same side, a diffuse bronchophony and a bronchial and puffing respiration. The bronchial ramifications of the upper lobe on this side, were found manifestly dilated, not altered in shape, but with thickening of their parietes. In this case, the branches of a lesser order exhibited as distinct circular cartilages as at the bifurcation of the trachea. The second case (obs. viii.) was that of a man forty-six years old, who died with the general symptoms of phthisis. The expectoration was puriform; the voice resounded strongly over the whole left side; and a little above the lower angle of the scapula, there was distinct pectoriloquy. On examination after death, there was found in the corresponding point of the lung a dilatation of one of the bronchi, of the size of a walnut; and in the same lung several other bronchi were dilated partially in different successive points, to triple or quadruple their natural size. The intermediate substance of the lung was flabby and compressed.

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[*] That the diagnosis, however, between phthisis and dilatation of the bronchi is often a matter of great difficulty, is proved by the inability of so acute and experienced an observer as M. Louis to distinguish them, in one case. See his *Recherches*, Obs. xi. p. 231, et seq.—*Transl.*

[†] Op. Cit. Obs. v. vi. viii. ix.

Case I. *Acute dilatation of the bronchi after hooping cough.*—A child, three and a half years old, and affected with hooping cough for three months, came into the *Hôpital des Enfans*, in January, 1808. The cough returned in fits after an interval of several hours, and was followed by a copious expectoration of a yellow, very fetid, puriform fluid. This fluid, which smelt like the pus from an abscess, was brought up by mouthfuls, rather than by the usual process of expectoration. The child always lay on the left side, which was found to yield a dull sound on percussion. In the intervals of the cough it slept well, and seemed to feel no pain. It died about a fortnight after its admission.

Dissection thirty-six hours after death.—The left lung was sound in the upper parts, but the inferior lobe was hard, heavy, livid, and slightly adherent to the costal pleura. On cutting into it, an ounce and a half of fetid pus, exactly like what had been expectorated, made its escape from a multitude of round, smooth cavities, varying in size from that of a large pea to that of a finger-end. On further examination it was found that these cavities were connected with, and were in fact mere dilatations of the bronchi. Each bronchial branch, after running about half-an-inch into the lung, became gradually enlarged, and finally terminated in a cul-de-sac, constituting one of the cavities above mentioned. Towards their termination, most of these dilated tubes would have admitted the little finger; and the smaller ones would have contained an ordinary quill. In their bronchi, there will be *diffused bronchophony* in place of pectoriloquy. When the dilatation is extensive, bronchophony and bronchial respiration exist over the whole space affected, and perfect pectoriloquy in some points only.

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† Op. Cit. Obs. v. vi. viii. ix.

CASE I. *Acute dilatation of the bronchi after hooping cough.*—A child, three and a half years old, and affected with hooping cough for three months, came into the *Hôpital des Enfans*, in January, 1808. The cough returned in fits after an interval of several hours, and was followed by a copious expectoration of a yellow, very fetid, puriform fluid. This fluid, which smelt like the pus from an abscess, was brought up by mouthfuls, rather than by the usual process of expectoration. The child always lay on the left side, which was found to yield a dull sound on percussion. In the intervals of the cough it slept well, and seemed to feel no pain. It died about a fortnight after its admission.

Dissection thirty-six hours after death.—The left lung was sound in the upper parts, but the inferior lobe was hard, heavy, livid, and slightly adherent to the costal pleura. On cutting into it, an ounce and a half of fetid pus, exactly like what had been expectorated, made its escape from a multitude of round, smooth cavities, varying in size from that of a large pea to that of a finger-end. On further examination it was found that these cavities were connected with, and were in fact mere dilatations of the bronchi. Each bronchial branch, after running about half-an-inch into the lung, became gradually enlarged, and finally terminated in a cul-de-sac, constituting one of the cavities above mentioned. Towards their termination, most of these dilated tubes would have admitted the little finger; and the smaller ones would have contained an ordinary quill. In their course they gave off branches, which, after running, at most, two inches, terminated in similar culs-de-sac. The mucous membrane lining these tubes was throughout of a deep livid red. It was thinner than natural, but was not in the slightest degree ulcerated. These dilated tubes were so numerous that an incision could not be made without dividing many of them: they constituted at least three-fourths of the volume of this part of the lung. The intermediate substance was of a greyish colour, compact but flabby, and retained no trace of its natural cellular structure. The right lung was sound. The mucous membrane of the trachea was of a livid red, particularly at its lower extremity; while that of the larynx, on the contrary, was very pale. The liver was very large, yellowish, soft, and fatty. The other viscera were sound.*

Case II. *Chronic dilatation of the bronchi.*—Miss M., aged seventy-two, affected upwards of fifty years with a complaint which presented most of the symptoms of phthisis, viz. frequent hæmoptysis, habitual cough with expectoration of opaque, yellow sputa, (having at one time the characters of pus, and at others those of puriform mucus,) and short and oppressed breathing. These symptoms varied much, having decided remissions, but hardly ever a distinct intermission. However, she was always able to attend to her affairs, and indeed never considered herself as sick. On her admission to the hospital, although broken down with years, she did not appear very ill, and exhibited merely her habitual symptoms, with the addition of a slight diarrhœa and some œdema of the legs. This latter symptom, however, progressively increased, with great increase of the dyspnœa, and she sunk, apparently more from the dropsical affection than from the original disease.

Dissection forty-four hours after death.—The lungs were attached to the ribs and the mediastinum by ancient and lax cellular adhesions. The substance of the lungs was soft and unelastic, and, on compressing them between the fingers, hard portions of various size were felt, especially in the right superior lobe. On cutting into this lobe, a great many rounded cavities were found, smooth, and of reddish colour internally, some of which were empty, and others containing a fluid like that expectorated by the patient. These cavities were of very unequal size, the largest being capable of admitting the end of the thumb. They were separated from one another by partitions of a pretty firm consistence, composed of the condensed pulmonary tissue. On further examination, they were found all to communicate with the bronchi, of which they were evidently continuations. These tubes, a short distance from their origin, and just where they cease to be cartilaginous, were found to be considerably dilated, and to retain this increased diameter, or to become progressively larger, to the point of their termination near the surface of the lung. In their course they gave off branches, some of which were dilated and others not. The dilated portions exhibited here and there small cartilaginous or bony points, particularly at the origin of the collateral ramifications. In these diseased bronchi it was impossible to trace the different layers of membrane; they appeared to consist of one only, which could not be separated from the substance of the lungs, and which was much harder and smoother than that which naturally exists in the branches which are deprived of cartilages. There was not the slightest mark of ulceration. Almost all the bronchi of the right superior lobe were in the state just described. The largest might be seven or eight times their natural size, while some were much less dilated, and others hardly at all. The whole of the space occupied by the hollows of these dilated branches was about three-fourths that of the whole superior lobe. Some of the cavities were only separated from each other by very thin partitions, consisting of the pulmonary tissue condensed into the state of membrane. In the middle and inferior lobes of the same side there were only a few of the bronchi slightly dilated. In the left superior lobe, two or three of them were considerably dilated, but not so as to form cavities like those on the opposite side: in the left inferior lobe there was no dilatation. The mucous membrane of the larynx and trachea was sound.

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* This case is considerably abridged; but nothing is omitted directly bearing on the subject of this work. Most of the subsequent cases will be treated in the same way.—*Transl.*

CASE III. *General dilatation of the bronchi of one lung. Conversion of the pulmonary substance into fibro-cartilage.*—A patient came into the Hospital Necker, in the winter of 1821-2, who had been affected with cough and copious muco-purulent expectoration ever since an attack of pleuro-peripneumony twenty years before: he had oppressed breathing; and on the left side of the chest, which was one-third smaller than the right, there was well-marked bronchophony around the lower angle of the scapula. This man died suddenly, with symptoms of apoplexy, after being only a few hours in the hospital.

On examination, the left lung was found reduced to the size of the two fists, and every where closely united with the costal pleura, by means of a fibro-cartilaginous membrane, except opposite the scapula, where it was distant from it an inch, being in this point connected by sero-fibrous adhesions of this length. This space also contained about three ounces of a bloody serosity. The whole of this lung was converted into a substance in appearance and consistence intermediate between cartilage and fibrous membrane. The two lobes, though intimately united, were still very distinguishable one from another, the upper being of a uniform slate-grey colour, and the other as white as tendon. When cut in thin slices, this substance was slightly transparent, and had nothing of the flaccidity of a lung simply deprived of air by compression. The bronchial tubes were in general dilated, the diameter of the latter divisions being only two or three lines less than that of the first: they terminated in culs-de-sac. The greater number of these branches contained a yellowish, opaque matter, in appearance intermediate between opaque mucous sputa and very soft cheese. Intermixed with this, there was a whiter chalky matter which resisted the scalpel. The mucous membrane of almost all these tubes, was of the colour of the lees of red wine, and slightly thickened. The smaller bronchial branches were obliterated and lost in the general semi-cartilaginous mass into which the substance of the lung was converted. There was no sign of tubercles. The right lung was quite sound.

CASE IV. *Chronic dilatation of the bronchi. Acute double peripneumony.*—A coachman, aged forty-one, was received into the clinical wards of the Faculté, 27th March, 1825. From infancy he had been subject to a cough attended by an expectoration of a yellowish or greyish colour, but which had not in any way prevented him from following his occupation. During the last six months, however, his complaints had increased; the cough had all at once become very frequent, and the expectoration of thick, yellow, opaque, and fetid matter, very copious. At the same time, there was also present, a slight irregular fever, night sweats, diarrhœa, emaciation, and increasing weakness; and six weeks before his admission he had had two severe attacks of hæmoptysis. He had suffered from pain in the right side, but never in the left. The only remedy to which he had had recourse during his illness, was a pectoral ptisan; and he had followed his business to within a few days of his admission into the hospital. At this time his state was as follows: emaciation inconsiderable, skin slightly yellow; pulse frequent, full, but not strong; cough frequent, expectoration thick, yellow, opaque, and somewhat fetid; no dyspnœa; appetite moderate, and no disorder of the digestive functions. The chest sounded pretty well on the right side, much less so on the left, especially in the lower part, which was evidently contracted. The respiration was good on the right side; but on the left, it was hardly perceptible laterally and behind, and was there accompanied by an obscure mucous rhonchus. On the upper parts of the same side, both before and behind, the respiration was replaced by a very distinct cavernous rhonchus; and about the lower angle of the scapula, there was a very strong mucous rhonchus. Over the whole of the left scapula there was imperfect pectoriloquy. From these signs I deduced the following diagnosis: *Excavation in the superior part of the left lung; contraction of the same side from an ancient pleurisy.* I left in doubt, for the time, the question as to the nature of the excavation; the probabilities seeming nearly equally in favour of its being the result of softened tubercles, and of a gangrenous eschar. (*Pectoral infusion with two drams of lime water,—draught, with æther and half a dram of extract of bark.*)

In the beginning of April he was better; the fever less, the complexion and appetite good. Percussion of the left chest a little above the nipple, produced a distinct *guggling*, with a sensation of vibration and a circumscribed *hollow resonance*, indicating, in this point, a cavity, with flexible and somewhat elastic walls, and containing a half-liquid matter. Every blow given, while the patient was speaking, produced a very marked catch or stammer in the voice. *April* 10. Expectoration more copious, puriform and fetid; breath very offensive: hardly any fever; appetite middling. A more complete exploration of the chest gave the following results: On the left chest, distinct pectoriloquy from the clavicle as low as the third and fourth ribs anteriorly; on the side, from the axilla to the fifth rib; and behind, from the top of the shoulder to the lower angle of the scapula and below. When the patient lay on the right side, pectoriloquy was also very evident on the lower parts of the left side, both posteriorly and latterly, which was not the case when in the sitting posture. A cavernous rhonchus, still more distinct than the pectoriloquy, existed in the same points. These signs allowing only two suppositions, namely, *a general and very considerable dilatation of the bronchi*, or *an anfractuous* or *multi-locular tuberculous excavation*, extending over nearly the whole of the left lung, I gave my opinion in favour of the first, from considering the general condition of the patient and the progress of the disease; still, however, leaving in doubt the co-existence of a gangrenous eschar in the lung. 18*th*. Considerable increase of fever during the two last days; cough more frequent, particularly at night; expectoration very copious, greyish and very fetid; return of the diarrhœa; loss of appetite. (*Same prescription. Half a dram of diascordium*[*] *twice a day.*) 22*nd*. Increase of all the symptoms; high fever; cough frequent; expectoration puriform, coherent, of an ash-grey colour, and still more offensive than usual, prostration of strength; tracheal rhonchus. On the right side the chest sounded well; the respiration was strong, and accompanied by a deep sonorous rhonchus, anteriorily and laterally; while posteriorly, it was bronchial, and accompanied in some places by a strong mucous rhonchus. There was also a slight crepitous rhonchus on the right side, about the anterior part of the sixth rib, and towards the roots of the lung, in which points the respiration was bronchial; and also a similar rhonchus at the roots of the left lung. Over the whole of the trachea there was a deep sonorous rhonchus. From these signs I announced the existence of *a central pneumonia (i. e.* not having yet reached the surface of the lung) on the right side, and also an incipient inflammation of the left lung, although its texture was compressed by the dilated bronchi. (*Three glasses of emulsion with six grains of tartar emetic,—white decoction*—half a dram of diascordium, ter.*) 23*rd.* Respiration still bronchial at the root of the right lung; crepitous rhonchus barely perceptible at the inner edge of the scapula: chest still yielding a good sound on the right side. He died next day.†

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[*] A very complex electuary of an astringent and narcotic quality invented by Fracastorius. It is named from the plant *Scordium* (*S. Teucrium*, Linn.) the leaves of which form one of its ingredients.—*Transl.*

Dissection thirty-eight hours after death.—The right lung was large and heavy, and scarcely collapsed at all on the thorax being laid open. Upon cutting into it, its texture was found, in general, pretty sound, but containing a great many small portions, of a more or less deep red colour, almost all unconnected with each other, of irregular form, dense, compact, exhibiting a granular surface when incised, and yielding, upon the slightest pressure, a fluid of a tawny yellow colour, resembling meat-soup. These portions were indurated in different degrees; the pulmonary substance of some of them being still crepitous, either at their exterior, or over the fourth, third, or even half of their extent. Their colour was equally various:—the greater number and the hardest were of a deep red, approaching to violet; some were of a greyish or yellowish red, or with a tinge of violet, less dense, and less granular; while others (and these were the smallest number) were softer, of an ash-grey, and very slightly semi-transparent. In these last, the incised surfaces presented scarcely any granular appearance, and exhibited, in different points, the healthy cellular texture of the lungs. These diverse shades of induration were sometimes re-united in the same diseased portion, each of which gradually passed into the natural structure of the viscus. The indurated lobules formed slight prominences on the surface of the lungs, and felt to the touch like accidental productions contained within their substance. They were very numerous and small in the upper lobe; less numerous, larger, and more distant in the lower; and still larger and much closer to one another in the middle lobe. In this latter, they formed, by their juxtaposition towards the roots of the bronchi, a compact mass nearly two inches in diameter. Near this and posteriorly, there was a small excavation entirely filled with a dirty, black, and extremely fetid matter. The walls of this excavation were not lined by any false membrane, but consisted of condensed pulmonary substance of a blackish colour which became gradually more dense as it receded from the cavity. This was evidently a gangrenous eschar. In the vicinity of this, and near the surface of the lung, were two or three bronchi dilated to the size of a goose-quill; and traversing the compact mass above mentioned, were several others of a still larger diameter, and terminating in culs-de-sac sufficiently large to contain a pea. The inner membrane of all these bronchi was smooth and of a deep violet-red colour. There was not a tubercle in the whole lung. The left lung was much smaller than the right, heavy, flaccid, and very little crepitous. Upon cutting into it, a great number of ovoid cavities presented themselves, which were either empty, or contained a small quantity of a dirty blackish or yellowish-red matter, like pus mixed with blood, and of a fetor approaching that of gangrene. These cavities were lined by the bronchial mucous membrane, which was of a very deep livid colour and smooth, though puffy and softer than natural. They were of very different size in different portions of the lung. In the lower lobe, they were very numerous, closely approximated, and almost all capable of holding an almond with its shell; while in the upper, they were much smaller and much more distant from each other. They all communicated with the bronchi, and, in fact, were found, on minute inspection, to be the continuation and termination of these, dilated in this extraordinary manner. The whole of these cavities taken together were nearly equal in size to one half the lung. It will be observed that they were the most numerous exactly in the points where pectoriloquy had existed during life. In the lower lobe, they were so close to one another as to leave between, only very thin partitions of condensed and firm pulmonary substance. In the upper lobe, there were some red and solid portions like those described in the right lung. The walls were of the culs-de-sac formed by the dilated bronchi, were as thick as those of the larger branches, and this thickening was caused partly by the thickened mucous membrane, and partly by the fibro-cellular envelop of the bronchi become more solid, and in many places cartilaginous. In some places the partition between two of these dilated bronchi was become wholly cartilaginous, and formed one mass with the degenerated envelopes. Besides these cavities, there existed another small one, of a very different character, near the origin of the bronchi. It contained a small quantity of a pulpy matter, of a decidedly gangrenous fetor. It did not seem to have any communication with the bronchi, but appeared to be the result of the gangrene of one of the bronchial glands.

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* A watery decoction of hartshorn shavings and bread, with syrup.—*Transl.*

† This case was witnessed by Barry, Crawford, Carswell, Gregory (son of the celebrated professor at Edinburgh), and Townsend, English medical gentlemen, besides many others, foreigners as well as French.—*Author.*

After the examination I placed the lungs in water with a view to their inspection on the following day. On looking at them twenty-four hours afterwards, I found that the maceration had whitened the incised surfaces in contact with the water; and I found, moreover, that in three or four of the dilated bronchi, which had not been opened, and to which the water had not penetrated, the mucous membrane was greatly altered, having become soft, of a reddish, greenish or blackish colour, and exhaling a decidedly gangrenous fetor.*

CHAPTER III.

OF CROUP, OR PLASTIC INFLAMMATION OF THE AIR PASSAGES.

CROUP has not been well understood very many years. It appears to have been unknown to the Greek and Arabian physicians; a circumstance less to be wondered at, as it must have been of rare occurrence in the very temperate or warm climates which they inhabited.† Ballonius *(Baillou)* was the first who noticed this disease in 1576, ‡ although there can be little doubt that the disease must have existed before that time. The imperfect state of morbid anatomy, and the great infrequency of cases wherein the expectoration of the croupy or false membrane strikingly and at once characterizes the affection, had no doubt prevented this disease from being distinguished from many others of the larynx and lungs. Even in much later times these diseases were confounded or mistaken; and it is evident, that the discharge of the pretended inner membranes of the bronchi, and of the veins and arteries of the lungs, described by Tulpius[*], and other observers of the seventeenth century,[†] were cases of croup. The first good description which we have of this disease we owe to Ghisi, a physician of Cremona, about the middle of the last century[‡]. Shortly after, the Scotch and English physicians[§] paid much attention to the subject, and were soon followed by the Germans and French. Quite recently Dr. Bretonneau, of Tours, has made us more fully acquainted with the disease, than any previous inquirer.[‖]

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* This circumstance points out the necessity of pathological anatomists being on their guard against changes that may take place after death. It seems certain that those bronchi found in a state of decomposition resembling gangrene on the second day of examination, were not so on the first, if we may be allowed to judge from the state of the *trunks* of these which were seen in the same condition as those which had been laid open. If, then, any thing had retarded the examination of the body for twenty-four hours, we should have no doubt imagined that the patient had died of an universal gangrene of the mucous lining of the bronchi. It seems even probable, that the partial inflammatory indurations would, in this case, have assumed a gangrenous appearance.—*Author.*

† For a complete bibliographical history of croup I refer the reader to the treatise of Michaelis "*De Angina Polyposa*;" Professor Rubini's "*Riflessioni sulla malattia communemamente denominata Crup*," *Parma* 1813; and to the recent treatise of Dr. Bretonneau, "*De la Diphtherite ou Inflammation pelliculaire*," *Paris* 1826. All of these authors prove by extracts from the writings of the ancient physicians, that the croup was known to several of them, particularly to Hippocrates and Aretæus; although its precise anatomical characters were not, owing to the imperfect state of pathological anatomy in those ages. The description of Aretæus, in particular, (Lib. i. c. 9.) is conclusive evidence, although, like so many others, he had confounded the term croup with the diphtherite of Bretonneau, or crusty pharyngitis. That the mildness of the climates inhabited by the ancient physicians by no means afforded an immunity from diseases of this kind, we have the testimony of modern writers on the diseases of temperate and warm climates. Among others see Hillary on the diseases of Barbadoes (second ed. p. 134) for an account of a severe epidemical bronchitis in the year 1758, which was certainly, if not croup, nearly allied to it. "I have no doubt (says Dr. Cullen—Thomson's edit. vol. ii. p. 41) of its being a very universal disease, with regard to place and country: but we can easily account for its not being much noticed, as it is a disease which occurs in infants who cannot explain their feelings, and as it proves suddenly fatal, leaving less time for calling the physician to observe it. And considering how lately it has been common to examine disease by dissection, we can easily perceive why, for so long a time, this affection has passed on entirely unobserved."—*Transl.*

‡ Opera, tom. I. Epidem. et Ephimer. lib. ii. Constit. Hiemal. ann. 1576, in annotat.—*Author.* It appears, however, that Ballonius has little claim to be considered as the first observer of the peculiar characters of croup, although it is certainly in his works that the existence of the false membrane is first distinctly recorded. From his own account, it is clear that he learned the fact of the false mem-

Anatomical characters.—Croup is an inflammation of the mucous membrane of the air passages, with exudation of plastic pus, (coagulable lymph,) which, becoming concrete at the very moment of its formation, lines the inner surface of this membrane to a greater or less extent. When this false membrane is removed, the subjacent tunic is found of a deep vivid red colour, occasionally livid, and somewhat thickened. This colour is commonly very uniform over the whole space covered by the false membrane, but is also not unfrequently unequal, and occasionally is even altogether wanting.[¶] In the greater number of cases, the degree of redness and swelling is less than in many instances of the dry catarrh. We cannot, therefore, attribute the plasticity of the pus in croup, the distinctive feature between it and the mucous catarrh, to a higher degree of inflammation simply. Besides, we see frequent examples of chronic plastic inflammations of the mucous coat of the intestines and bladder, with hardly any pain, or other particular symptom. And I have myself seen a case of chronic croup of the same sort, which was confined to the larynx, and supervened during the suppuration

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brane being found, from another person: "*chirurgus affirmavit se secuisse* cadaver pueri," &c. See Ballon. Op. Om. Med. Venet. 1734. tom. i. p. 132. See also Rubini's remarks on this passage—*Riflessioni*, p. 200, et seq.—*Transl.*

[*] N. Tulpius's Obs. Leidæ, 1641, obs. ix. xii. et xiii.

[†] Collect. Acad. tom. vii. p. 394. Several of the cases referred to were, however, fibrinous concretions formed in the bronchi during hæmoptysis.—*Transl.*

[‡] Martin. Ghisi, Lettre Mediche. Cremona, 1749.

[§] Dr. Home's "Inquiry," which is the first systematic account of croup in this country, was published in 1765: but the disease had been previously noticed under the same name by Dr. Patrick Blair, in his *Observations on the Practice of Physic*, published in 1718.—*Transl.*

[‖] See his work *Sur la Dipththerite*, which has been published since our author's treatise went to the press.—*Transl.*

[¶] Hufeland's Journal, vi. B. p. 559.

of a scrofulous tumour of the thyroid gland: here, after a cough, almost dry, of more than two months standing, and attended by hardly any other symptom, the false membrane was expectorated, without any previous indications of its presence in the larynx. The false membrane which so frequently forms on blisters is, of itself, sufficient to prove that it is much less to the degree than to the nature of the inflammation, that we are to attribute this concretion or coagulation of pus in certain cases. Indeed, the cause of it is much more probably to be attributed to some peculiar disposition of the fluids, than to any affection of the solids.

The false membrane of croup corresponds exactly with the form of the canals which it covers. Its thickness is usually somewhat greater in the larynx and trachea than in the bronchi, and varies from less than half a line to a line. Its consistence is about that of boiled white of egg; but this usually diminishes towards its extremities, so that it becomes sometimes, in this situation, scarcely more solid than the thick phlegm of catarrh. It is of a white colour, with sometimes a shade of yellow, and is almost entirely opaque.

Some days, or even hours, after its formation, the false membrane begins gradually to be detached from the mucous coat to which it had been closely adherent, and after being broken into fragments by the cough, is sometimes expectorated. The separation is effected by a more liquid secretion, which, becoming in its turn also concrete, constitutes a second false membrane. This process may be repeated several times in succession: but in general each successive formation is less consistent than the preceding. The croupy membrane, properly so called, is most commonly confined to the larynx and upper part of the trachea, degenerating as above stated, both upwards and downwards, into a substance of a softer texture, which is the chief cause of the imminent suffocation which sometimes occurs even during the first hours of the attack. In other cases, the false membrane extends over a great portion or even the whole of the bronchial ramifications, from which it may occasionally be separated, after death, by a very slight degree of force. Sometimes the disease is confined to the bronchi and their branches, there being no trace of it in the larynx and trachea.[*] More commonly, as has been shown by Bretonneau, the inflammation commences on the tonsils of the pharynx, and from thence spreads, at the same time, downwards to the larynx and upwards to the cavity of the nostrils, which latter it sometimes entirely covers. The affection usually stops at the œsophagus, but occasionally the false membrane extends to the stomach. In one instance M. Bretonneau saw a false membrane formed behind the ear of a child; and Dr. Bourgeoise, of Paris, has published his own case, in which a similar formation took place round the anus. In children, the disease almost always begins in the bronchi or larynx, and very rarely extends beyond the glottis; while in adults it more frequently originates, as has been above stated, on the tonsils or pharynx.[*] M. Bretonneau has successfully shown that such cases of what may be called plastic angina, have been frequently mistaken for the gangrenous affections of the same parts (*cynanche maligna*). Perhaps this author may have gone somewhat too far in limiting the existence of the last disease.[†] Certain it is that examples of it occur as well with as without false membranes. In a case of scarlatina in a man of middle age, which was under my care in the Necker Hospital, it was quite clear to me that the gangrenous eschars of the tonsillary membrane preceded the appearance of the false membrane, which, in the end, extended into the larynx; and it is quite easy to conceive that the inflammation by which nature circumscribes the progress of the gangrene, or, as some may think, which is excited by the irritation of the eschar,—may be itself of a plastic kind and give rise to a false membrane, just as it is possible that the intensity of the inflammation may occasion the gangrene. In the former case we have an instance of idiopathic gangrene; in the latter a case of crusty or pellicular pharyngitis accompanied by gangrene.[‡] I am not acquainted with any instance of croup which originated in the larynx or bronchi, being accompanied by gangrene; but in cases where it has sprung from the extension of a gangrenous and plastic cynanche, I have myself seen gangrenous eschars on the mucous membrane both of the larynx and pharynx. In these cases, the false membrane was of a dirty greyish or green hue, and exhaled the horrible fetor peculiar to gangrene.[§]

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[*] In this case the disease is not in reality *croup*, but that variety of bronchitis accompanied by false membranes, described by Horstius, Raickem and Guersent (Dict. de Med. t. vi.) and we must no more confound them under one head than we confound laryngitis with the acute mucous catarrh.—(*M. L.*)

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[*] In Mr. Rumsey's cases, which will be noticed in a subsequent note, all the subjects were children.—*Transl.*

[†] See the article *Angine Couenneuse* in the *Dict. de Medicine*, by *Guersent*.

[‡] Bretonneau does not deny that gangrene may be the consequence of the crusty or pellicular inflammation; but merely asserts its extreme rarity; he himself not having met with a single example of it in more than fifty cases examined after death.—(*M. L.*)

[§] No reasonable doubt, I think, can be entertained by the readers of M. Bretonneau's work, that the croup and cynanche maligna are often identical, or rather, that what has often been considered as a gangrenous affection of the throat, is merely an inflammation of the same kind as that of croup, and characterized by the formation of a membranous exudation of a peculiar kind. But however we may concede the identity of the nature of the inflammation in the two diseases, we cannot admit the proposition that simple croup, that is, croup unaccompanied by any pharyngeal

Symptoms.—When the disease begins in the larynx, in its onset it is frequently altogether like that of a common cold; but

affection, does not exist as a separate disease. Neither, I think, can we agree with this writer in considering the inflammation of the mucous membrane in the scarlatina anginosa, as specifically different from that which occurs unaccompanied by cutaneous eruption, and which he describes under the name of *Diphtherite.* The frequently fatal termination of the angina maligna, whether accompanied by a cutaneous eruption or not, by extending to the windpipe, is noticed in all our best English writers on this disease. The account given by Dr. Starr of an epidemic of this kind, which raged in Cornwall in the year 1748, and which is described by him in No. 495 of the Philosophical Transactions under the name of *Morbus Strangulatorius*, is noticed by M. Bretonneau. Dr. Fothergill, whose treatise on the malignant sore throat appeared in 1748, does not notice this termination in his general history of the disease; yet we find, on referring to the fatal cases recorded by him, that "great difficulty of breathing" took place in all, previously to the fatal termination. See his works by Lettsom, vol. i. p. 379, 382, 388. In Huxham's account of the epidemic of 1752-3 the same termination is distinctly noticed. In speaking of the expectoration of what he terms *the sloughs*, he says that a piece of the *internal membrane of the windpipe* was discharged, meaning, of course, the false membrane of croup. He also notices the disease as "killing suddenly in a peripneumonic manner."—*Dissert. on the Malig. Ulcerous Sore Throat.* Dr. James Johnstone, the elder, in his "Dissertation concerning the malignant epidemical fever of 1756," speaking of the malignant angina, says, "At last, when death is at hand, respiration becomes *unexpectedly* difficult, quick, and peripneumonic." p. 10. But it is in the treatise by Dr. James Johnstone, son of the preceding writer, that we find the connexion of the angina maligna and croup,—and indeed the very identity of these contended for by Bretonneau,—fully and distinctly stated. See his Treatise on the Malignant Angina, Worcester, 1779. "There is but one other species of angina (he says) from which this disease [A. maligna] requires any distinction, and that is the croup. A small degree of attention to the several divisions of that distemper, which have been made by the best writers, will show that in respect to *many of the cases there can be no distinction, because in reality there is no difference,*" p. 54. He accordingly divides the disease into two species—*A. malig. tonsillaris*, and *A. malig. trachealis.* In Dr. Withering's "Account of the Scarlet Fever and Sore Throat," published in the same year as Dr. Johnstone's treatise, the same extension of the disease to the passages opening into the pharynx, is noticed. "This affection of the fauces (he says) in some patients seemed to extend down the gullet to the stomach . . . . . . : in others it spread itself down the windpipe to the lungs, as was evident from the cough, the strait breathing, and other peripneumonic symptoms. And in others again, its progress along the Eustachian tube was indicated by sharp pains in the ear," p. 13. In Dr. Cullen's account of the cynanche maligna it is stated, that "from dissections it appears that, in the C. Malig. the larynx and trachea are often affected in the same manner as in the C. trachealis; and it is probable that, in consequence of that affection, the C. maligna often proves fatal by such a sudden suffocation as happens in the proper cynanche trachealis." Thomson's ed. vol. ii. 39; and in his chapter on C. Trachealis he asserts the fact still more explicitly. "It frequently happens that the C. Maligna, which has its first and principal seat in the mucous membrane of the tonsils and uvula, communicates and spreads down to the glottis and trachea, and to a considerable length in the bronchiæ, and is there attended with the same sloughs that happen in the fauces, and then it will produce all the symptoms of the C. stridula, or trachealis."—*Ibid.* p. 43. In a paper published by Mr. Rumsey, in the Transac. of a Soc. for the Improvement of Med. and Chirur. Knowledge, containing an account of an epidemic croup observed by him in the year 1790, the diphtheritic affection of the tonsils is noticed. "Most of the cases (he says) which occurred in November and afterwards, were attended with inflammation and swelling of the tonsils, uvula and velum pendulum palati, and frequently *large films of a white substance were formed on the tonsils,*" vol. ii. p. 20. The same appearances have been more recently recorded by Mr. Mackenzie in the Edin. Med. and Surg. Journ. for April 1825, by Mr. Pretty in the Lond. Med. and Phys. Journ. for January, 1826, and by Dr. Hamilton in the Ed. Journ. of Med. Science for October 1826. The first writer recommends the topical use of a strong solution of lunar caustic, in the same manner as the muriatic acid is applied by Bretonneau.

For the best English account of simple croup, the reader is referred to Dr. Cheyne's after the lapse of some hours, sometimes only after one or two days, the cough becomes more violent, resounding in the larynx and trachea as in a metallic tube, and with a peculiarity of character which has been compared to the crowing of a cock. Even the voice, and yet more the inspirations which occur in the fits of coughing, have something of the same sound. This is denominated the *croupy voice or cough.* With this there is very great oppression, which is changed into imminent suffocation, particularly when the false membrane begins to separate. This threatening suffocation is equally excited by inspiration, expiration, or cough, and soon becomes real if the loosened fragments of false membrane are not expectorated. If the disease is confined to the bronchi, the same symptoms exist, with the exception of the croupy sound. If it commences in the fauces, spots of a yellowish or greenish colour, surrounded by a deep red, are at first perceived on the tonsils, the pillars of the veil of the palate or the back part of the pharynx. These specks gradually extend, unite, and increase in thickness, so as at last to form a complete crust, like that of inflamed blood, lining the whole entrance of the fauces, and extending in a greater or less degree into the larynx, trachea, and bronchi.*

If the croupy affection results from a gangrenous angina, we can sometimes distinguish the eschars before the formation of the false membrane.† In all cases, the gangrene is indicated by its

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work on the Pathology of the Larynx and Bronchi; and to Mr. Porter's Surgical Pathology of the Larynx and Trachea. On the subject of croup, as on most other contested points in medical history, much confusion has been occasioned by the circumstance of different names being given to the same disease, on the one hand, and of different diseases being described under the same name, on the other hand. See the various writers on *Laryngitis, Tracheitis, Bronchitis, Acute Asthma, Bronchial Polypus, Suffocative Catarrh, &c. &c.* See also the articles *Croup* and *Throat, Diseases of*, in the Cyclopædia of Pract. Med. the former by Dr. Cheyne, the latter by Dr. Tweedie: and the elaborate article by Dr. Copland, in the Dict, of Pract. Med. In these articles much of the practical difficulties thrown round the affections of the pharynx, larynx, and trachea, by the French authors, will be found removed by a more discriminate classification of the diseases.—*Transl.*

* While acknowledging the existence of true gangrene in certain cases of the cynanche maligna, it is evident that Laennec does not recognise any essential difference between this affection and true croup, except that of site. Accordingly, we find him coinciding with Bretonneau and Guersent, in regarding Croup simply as a plastic or pseudo-membranous inflammation, either confined to the larynx, or extending at the same time to the trachea and bronchi, but not rising above the glottis; while the cynanche maligna is regarded as an inflammation of precisely a similar kind, but commencing in the throat, and, after occupying the tonsils and pharynx, spreading, more or less rapidly, over the veil of the palate and nasal fossæ, on the one hand, and, on the other, creeping into the larynx, trachea, and bronchi. Hence, it will be observed, that in the remaining portion of the present chapter, he does not separate the consideration of the two affections.—(*M. L.*)

† Bretonneau has shown that these pretended eschars, which "we can distinguish before the formation of the false membrane," are nothing else but the false membrane itself changed by the contact of the air, and rendered fœtid by decomposition. (Op. Cit. p. 44, et reg.)—(*M. L.*)—But it does not follow that this is invariably the case; and there seems no good reason why the inflammation surrounding a gangrenous speck may not (as is above observed by Laennec) be of a plastic kind and give rise to the diphtheritic membrane.—*Transl.*

peculiar odour, sooner than by any other symptom. If the disease terminates favourably, we can, day by day, observe the progress of the cure in examining the interior of the throat: the false membrane falls off and is replaced by an exudation of a thinner and less plastic character, or one not at all differing from the mucous discharge of catarrh. At other times, the membrane, in place of being detached, is gradually absorbed,—becoming at first thinner and less opaque, then sufficiently transparent to show the redness of the membrane beneath it, and finally disappearing altogèther.

Croup, even when most partial, is almost always accompanied by great constitutional disturbance. In the majority of cases the symptomatic fever is acute and very severe; the action of the heart being, at the same time, frequently irregular. In some cases, particularly such as occur in hospitals, the state of the system is very different, there being evident marks of a septic change in the fluids of the body: the pulse is but little accelerated, the skin harsh and dry, the debility extreme, and the breath fetid even where no gangrenous specks exist. This variety is denominated *asthenic* by Guersent and Bretonneau. In it the false membrane, especially that lining the throat, is frequently soft and friable, like soft cheese.

The symptoms above enumerated are sufficient to indicate the disease when they occur in a certain number together; but it must be allowed that, if we except the expectoration of membranaceous fragments, or the appearance of false membrane in the fauces, there is not one of them which is pathognomonic.*

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* This is so much the case that it has been found necessary to admit the existence of a *false croup*, in which there is no formation of false membrane, and which yet, at its very commencement, exhibits all the symptoms of the full-formed disease, insomuch that the two affections are scarcely ever sufficiently discriminated to prevent the administration of improper or useless remedies. In our difficulties, indeed, we have merely negative and insufficient signs to direct us—such as a little less fever, a less hissing respiration between the fits of coughing, less complete loss of voice, and a more rapid diminution of the symptoms. I say nothing of the negative signs adduced by Bretonneau, viz. the want of the redness of the tonsils, and of the swelling of the lymphatic glands of the neck, because they would only be then valuable if the inflammation of croup always commenced in the pharynx, which remains to be proved.—(*M. L.*)

After this disheartening statement, I cannot resist the opportunity of laying before the student the following graphic delineation of an attack of the true croup, by a most experienced observer, and not without hopes that it may so fix itself on the mind as to prove an ever-present touchstone or pathognomonic standard, in actual practice:—"More generally the patient has been for some time in bed and asleep before the nature of the disease with which he is threatened, is apparent; then, perhaps without waking, he gives a very unusual cough, well known to any one who has witnessed an attack of the croup; it rings as if the child had coughed through a brazen trumpet,—it is truly a *tussis clangosa*; it penetrates the walls and floor of the apartment, and startles the experienced mother—'Oh I am afraid our child is taking the croup:' she runs to the nursery, finds her child sleeping softly, and hopes she may be mistaken. But remaining to tend him, before long the ringing cough, a single cough, is repeated again and again the patient is roused and then a new symptom is remarked,—the sound of his voice is changed; puling and as if

The croupy voice or sound, independently of its not being always well-marked, does not occur until after the disease has made great progress. The cough is similar, or nearly so, in other diseases, particularly in certain cases of hooping cough, in which the *sonorous inspirations* sometimes perfectly resemble the crowing of a cock.

I have only met with one case of bronchial croup, within these few years, of sufficient severity to be recognized from the beginning, and which was soon more fully characterized by the expectoration of fragments of false membrane moulded on bronchi of different diameters. In this case, which occurred in a child six years old, the stethoscope detected, during the whole course of the disease, no other respiratory sound, but that of a *dry respiration*, evidently tubular or bronchial, unmixed with any of that crepitous dilatation of the pulmonary cells so strongly marked in infancy. This sign coinciding with a natural resonance of the chest, will suffice (if it is constant, as I presume it will be found to be) to indicate the bronchial croup; since it exists in no other case, except sometimes and in a much less degree, in dilatation of the bronchi; a chronic affection, generally of very partial extent, and which can hardly be confounded with croup by the most inattentive observer.*

Occasional causes.—Croup is unquestionably much more frequent in infancy than adult age. It is often epidemic, particularly in places exposed to the north and north-west winds, and when these winds are more than usually prevalent. Eruptive fevers, particularly scarlatina, are sufficiently often complicated with this disease, to justify our considering them, or the causes

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the throat were swelled, it corresponds with the cough: the cough is succeeded by a sonorous inspiration, not unlike the kink of pertussis; the breathing, hitherto inaudible and natural, now becomes audible, and a little slower than common, as if the breath were forced through a narrow tube; and this is the more remarkable as the disease advances. A blush of inflammation may sometimes be detected on the fauces, and, in some rare instances, a slight degree of swelling round the larynx, and the child complains of uneasiness in his throat, and says he is choking. The ringing cough followed by crowing inflammation; the breathing, as if air were drawn into the lungs by a piston; the flushed face; the tearful and bloodshot eye; quick, hard, and incompressible pulse; hot, dry skin; thirst, and high-coloured urine—form a combination of symptoms which indicate the complete establishment of the disease."—*Cyclopædia of Pract. Med.* Art. Croup, (vol. i. p. 493,) by John Cheyne, M.D.—*Transl.*

* It must be admitted that the brief exposition given by Laennec of the symptoms and progress of the plastic inflammation of the air passages is insufficient: it is manifest that the whole chapter was written in great haste. For more complete details I refer the reader to the writers quoted by Laennec, viz. the Treatise on Diphtherite, by M. Bretonneau, and the two articles of M. Guersent in the Dict. de Med.

The stethoscopic phenomena are of no value in the true croup. Auscultation practised on the larynx or between the scapulæ, enables us merely to hear more distinctly the hissing sound so perceptible by the ear.—(*M. L.*)

To the works named by Dr. Mer. Laennec in the above note, I would add several of those referred to at the end of this chapter, particularly those of Cheyne, Jurine, Rubini, and Copland.—*Transl.*

of them, as among the causes of croup. The wide extension of this plastic inflammation of the mucous membranes, and its affecting parts very distant and even unconnected with each other, might lead us to suspect, at least, that its cause is rather some special alteration of the fluids than a primary irritation of the membrane on which it is developed. The asthenic croup prevails particularly in hospitals, and would seem occasionally to be propagated by infection. Indeed, many practitioners have looked upon croup in general, as well as the malignant angina, as contagious. This question may still be considered as undetermined; however, the case of M. Bourgeoise, already alluded to, would seem to show that it is not safe to respire too closely the breath of patients labouring under this disease.[*]

Treatment.—If croup is not accompanied by a strongly marked asthenic diathesis, or does not occur in very young infants, the treatment ought to commence with one or two bleedings from the arm or foot. In doubtful cases, it would seem preferable rather to omit bleeding than to destroy, by injudicious depletion, the powers requisite for the separation and excretion of the false membrane.[†] Blood-letting, indeed, in this, as in other diseases which have reached the period of suppuration, is rather a preventive of future mischief than a measure likely to lessen that which already exists. And, in fact, in the case in question, the danger arises much less from the inflammation than from the mechanical obstacle to the respiration occasioned by the false membrane. In children, leeches to the throat, repeated more or less frequently according to the strength of the patient and the severity of the disease, may advantageously take the place of venesection; and in adults, their repeated application may be useful after general bleeding has been had recourse to. Leeches have the advantage of producing, in addition to the unloading of the capillaries in the vicinity of the affected part, a sort of local eruption, which unquestionably is sometimes beneficial as a derivative. Other derivatives, however, and of the most energetic kind, must be put in requisition, particularly blisters and sinapisms. These are, in general, more advantageously applied to the lower extremities, than in the vicinity of the disease. Good effects have, nevertheless, been obtained from the application of a cataplasm wetted with muriatic acid to the anterior part of the larynx. Perhaps this may act otherwise than as a rubefacient. It is at least certain, that experience has proved that no other application is so effectual in removing the false membrane from the fauces, as that recommended by Van Swieten, viz. one part of muriatic acid and three of honey, with which the specks are anointed by means of a pencil.* All practitioners who have had occasion to see a good deal of this disease, will readily admit, that these measures, although very rational and conformable to the results of experience in the treatment of inflammatory diseases in general, are nevertheless rarely sufficient, and that very few well characterized cases have yielded to their influence. Others have consequently been had recourse to. I shall here notice those only which have been found decidedly beneficial. Of this kind are emetics repeated daily or even twice a day.† They evidently accelerate the separation of the adventitious membrane, and favour its expulsion. However valuable this treatment may be, and I have myself obtained cures which I could attribute to it alone, it is no doubt too true that the greater number of cases still prove fatal, even when it is called in to aid the means already detailed. The internal use of hydrosulphuret of potass was, some years since, cried up as a sort of specific in croup. It is one of the ancient family of the alkaline resolvents, by which the chemical physicians, followers of Sylvius of Leyden, proposed to correct the too great plasticity or viscidity of the fluids, and even to dissolve concretions already formed. I have before spoken of this alkaline treatment. In the present case it is sufficient to remark, that its effects are too slow to be of any use in a disease of such rapid progress as croup. In small quantity its effects are insignificant; and in larger and more repeated doses, it must be more injurious as an irritating, acrid, and almost caustic substance, than it can be beneficial as an alkaline remedy. Pretty numerous successful results have been obtained from mercurial frictions exhibited in such doses as speedily to produce salivation; and in the actual state of the science I think no prudent practitioner ought to neglect this method conjointly with blood-letting and emetics.* The efficacy of this practice, even in a very striking degree, cannot be questioned in many other inflammatory diseases, particularly hepatitis and peritonitis. Still the success of even the mercurial treatment is not sufficiently great to hinder us from looking for other means; and if I had had occasion to treat this disease since I have experienced the efficacy of emetic tartar in large doses in many inflammatory diseases, I would certainly have had recourse to it with considerable confidence.

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[*] The disease of M. Bourgeoise was a case of the pellicular or pseudo-gangrenous angina, the contagious nature of which has been rendered extremely probable by the observations of Bretonneau, Guersent, and others; but the true croup appears insusceptible of transmission by contagion. These two forms of plastic inflammation differ in some other points of view, which may be here noticed: for instance, we have no account of an epidemic of the true or simple croup, while the pseudo-gangrenous or pellicular angina, is rarely sporadic; again, the true croup is rare among adults, but the pellicular angina affects indifferently adults and children, although it in general rages more severely among the latter.—(*M. L.*)

[†] On this passage Dr. Cheyne makes the following judicious remarks, in the article quoted above. "As to the question of bleeding in croup when the disease is once established, no doubt ought to exist, unless perhaps we may hesitate with respect to its stage. If the patient is in the first or inflammatory stage, no experienced physician will omit bleeding; if in the second, or that of suppuration, no physician will propose it. If it were doubtful to which stage the symptoms belonged, it would be preferable to bleed: the *anceps remedium* ought to be preferred. Nothing but the mingling together of incongruities and consequent misapprehensions of croup could have induced an eminent physician like Bretonneau to make so dangerous an observation as the following: 'I am forced to declare, contrary to the received opinion, that bleeding in croup has done harm, and accelerated rather than retarded the spread of the coriaceous inflammation. I did not abandon this measure till after reiterated proofs of its injurious effects.' Physicians need not be told not to bleed in *cynanche maligna*, it never was their practice to do so, nor would they willingly bleed in any form of membranous angina; but if they renounce blood-letting in the first stage of croup, which they are taught to do by this sweeping dogma of alleged experience, they will part with the best shaft in their quiver." Cyc. of Pract. Med. vol. i. p. 500.—*Transl.*

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* The researches of Bretonneau have afresh demonstrated the importance of topical applications in the plastic inflammations of the air passages. The mixture of Van Swieten, and, still better, the pure muriatic acid applied by means of a sponge to the affected part, were unquestionably beneficial in the epidemic of Tours; and however painful the practice may be, it can never henceforth be omitted with propriety, in the cases where the disease commences in the pharynx. When it originates below the glottis, that is, in the *true croup*, Bretonneau has proposed (and daily experience of its happy effects justifies the proposal) to introduce pulverised alum into the air passages. This is effected by means of a small hollow cylinder of wood containing the alum, to which two tubes are attached; through one of these the operator blows forcibly, so as to convey the powder to its destination. The operation is repeated two or three times daily. It immediately occasions a great heat in the throat and an intense thirst, which are allayed by allowing the patient to drink cold water at discretion. Insufflations of this kind may be beneficially applied in other diseases. M. Ambroise Laennec of Nantes has used them with the greatest success in severe tonsillitis, in the variolous cynanche, and in œdema of the glottis; (*Revue Med.* Oct. 1828;) and we might anticipate happy results from the practice in laryngeal pthisis, if it did not unfortunately happen that this affection is almost always complicated with tuberculous disease of the lungs.—(*M. L.*)

† "In very few cases have I known the child survive the second stage of croup; and in all of these the children recovered while using a solution of tartarised antimony. Emetics I had repeatedly given in the second stage of croup; but *in these cases*, the patients were *kept sick for two or three days, with scarce any interval.*"—Cheyne's Pathology of the Bronchia, &c. p. 52.—*Transl.*

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* It is hardly necessary to inform the English reader that the use of mercury, in the form of calomel, given internally in large and frequently repeated doses, has been carried to a great extent in this country. This practice was introduced by Dr. Rush, and was extensively used, and at one time cried up as almost a specific, by Dr. Hamilton of Edinburgh. He administered the medicine in doses of from one to five grains every hour. In the later editions of his treatise, this author admits that he had exaggerated the efficacy of calomel in this disease; an opinion in which I believe he will be joined by every experienced practitioner. It would appear from Dr. Bretonneau's treatise, that this practice, although fallen into comparative disuse in this country, is likely to be revived in France.—*Transl.*

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CHAPTER IV.

OF BRONCHIAL HÆMORRHAGE.

BY this term I wish to designate that kind of spitting of blood, which consists in simple exhalation from the surface of the bronchial membrane. Hæmoptysis was attributed by the ancients to rupture of the vessels of the lungs; and this opinion, which is

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1833. Copland (J., M.D.) Dict. of pract. med. (Art. *Croup.*) *Lond.* 1833.

Transl.

that of the vulgar, is perhaps still held by certain physicians who make a point of never admitting any new doctrines until they are so generally received as to demand their assent whether they will or no, and without examination. Be this as it may, the theory in question, if adopted without sufficient proof, has been perhaps with as little reason abandoned, since the phenomena of exhalation, in health and disease, have been better understood. It is not impossible that an aneurism of one of the branches of the pulmonary artery, or a varix of the veins, may, by rupture, give occasion to hæmorrhage, although no well described instance of the kind has come to my knowledge. When softened tubercles burst into the bronchi, the slight hæmorrhages that accompany this accident, arise, no doubt, from the rupture of small vessels; and we shall find hereafter that losses of blood of much greater consequence, and even mortal, may result from the rupture of a vessel traversing a tuberculous excavation. Other instances of fatal hæmoptysis arising from the rupture of a vessel, are afforded by aneurisms opening into the trachea, bronchi, or substance of the lungs. However, it can no longer admit of question, in the present state of medical knowledge, that the greater number of cases of slight or moderate hæmoptysis, consist in the simple exhalation of blood from the bronchial membrane; while the severe cases originate chiefly in the vesicular structure of the lungs, and constitute the affection which will be noticed hereafter under the name of *Pulmonary Apoplexy*.

Anatomical characters.—On examining subjects who have died of bronchial hæmorrhage, or while labouring under it, more or less of coagulated or fluid blood is found in the bronchi. On the surface of the coagula, we sometimes observe fibrinous concretions in the form of polypi. The mucous membrane is commonly a little softened, and is impregnated or tinged with blood through its whole depth.

Signs and symptoms.—The discharge is small or at most moderate, and the blood is frothy, and sometimes clotted, particularly towards the end of the attack. Those profuse hæmorrhages, which are vulgarly called *vomitings of blood*, arise almost always from pulmonary apoplexy. On this account, the smallness of the discharge, in any case, may be considered as affording a strong probability that the hæmoptysis is the result of simple exhalation. The absence of the stethoscopic signs of pulmonary apoplexy, adds greatly to the certainty of our diagnosis. In the bronchial hæmorrhage, the chest is perfectly sonorous. There exists no crepitous rhonchus; but only a mucous rhonchus with unequal bubbles, which are usually larger than those of catarrh, and seem to be formed by more liquid materials, and to burst more frequently. The rhonchus is more or less abundant according to the quantity of blood effused. When the hæmorrhage is slight, there is no general disturbance of the constitution perceptible: even the pulse continues natural. When the hæmoptysis is more considerable, it is attended by a distinct febrile state; the pulse becomes frequent, and exhibits a vibratory character, independent of either its force or frequency.

Occasional causes.—These are such as produce general plethora, or local conjestions of blood in the lungs; such as the abuse of spirituous liquors, excessive exertion, particularly of the organs of respiration and speech, suppression of an habitual hæmorrhage, the presence of numerous crude tubercles in the lungs. We frequently find hæmoptysis vicarious of the menses, and recurring with considerable regularity; and discharges of this kind have been known to last thirty and even forty years.* Suppression of the hæmorrhoidal discharge appears to me much more frequently to give rise to pulmonary apoplexy. Epileptics and other subjects of strong convulsions frequently discharge a bloody froth by the mouth. In these cases, the blood comes no doubt partly from the bronchial membrane, but also partly from the lining membrane of the mouth. The bronchi of a great many subjects, dead of different diseases, are found covered here and there with blood, evidently exhaled in the last moments of life; in like manner as the pulmonary congestions occurring after death, which we shall notice hereafter.

Treatment.—This consists most commonly in the more or less repeated use of blood-letting. Taking blood from the foot is generally preferable in women when there is suppression of the catamenia. When the detraction of much blood is not requisite, the application of leeches to the inner side of the thighs or below the ancles, may be substituted. I give these places the preference to the vulva, for various reasons; and among others, because I am convinced from many comparative trials, that leeching from the last-mentioned place is not more effective as a derivative, than from the other two, particularly if the blood is taken from both at the same time. Dry cupping or with lancets, sinapisms, stimulating foot-baths, may be usefully employed after venesection, or in cases where this is not necessary.

Rest and absolute silence, a cool air, abstinence from wine and stimulant food, and a regimen proportioned in strictness to the severity and extent of the hæmorrhage, are accessory measures by no means to be neglected. The same remark applies to the use of mucilaginous drinks, such as decoction of comfrey-root or marsh mallow, rice water, solution of gum arabic or tragacanth, &c.† Acids and astringents are also commonly employed, particularly *l'eau de Rabel*,* or the sulphuric acid sufficiently diluted, alum, tormentilla, bistort, kino, pomegranate bark, and, of late, rhatany root and its extract. These means are more hurtful than beneficial at the commencement of the hæmorrhage; but they may sometimes be advantageously employed in old cases, which are combined with an atonic state of the system, or when the blood is only slightly coloured and feebly concrescible. In this last case I have sometimes used with benefit the dry sulphate of iron. To derive advantage from astringents they must be given in larger doses than is usual. I give, for example, from one to four drachms of alum in a pint of any sweet mucilaginous drink.†

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* Tulpius lib. ii. cap. ii.—Nov. Act. Nat. Cur. vol. i. obs. 1.

† These latter measures, as indeed the common usage of practitioners, are in direct opposition to the principle of cure so much insisted on by Mr. Davidson in his "Observations on the Pulmonary System," viz. that of withholding every kind of fluid. But it is evident that his practice is founded on a misconception of the physiology of nutrition in respect of liquids.—*Transl.*

When an active hæmoptysis is checked, Sydenham advises the patient to be purged, and looks upon this means as most likely to prevent a relapse. I have always adopted the same practice, (except when evidently contra-indicated,) and, as it appeared, frequently with advantage. Obstinate spittings of blood, which have resisted repeated bleedings, sometimes terminate instantaneously under the effect of a purgative.

CHAPTER V.

POLYPUS OF THE BRONCHIAL MEMBRANE.

THIS is a very rare affection. I have only met with three examples of it on record.‡ These appeared to be of the same nature as the vesicular polypi of the nostrils, ears, and os uteri, that is to say, of a texture analogous to that of the mucous membranes, and containing small serous cysts. I lately met with a concretion in one of the large bronchi of a phthisical subject, which might have been easily mistaken for a polypus. It was about an inch and a half long, and from four to five lines thick, and almost entirely filled the canal in which it lay. It adhered closely to the angle formed by the union of the two larger bronchi, and although it lay in the left, in the fits of coughing its moveable extremity plugged up the opening of the right branch, and occasioned at the time imminent suffocation. It is remarkable, however, that although it plugged up almost entirely the left branch, insomuch as to leave not more than half a line of space for the passage of the air, it neither impeded respiration on this side, nor prevented the manifestation of pectoriloquy in a cavity in the upper lobe.[*] The texture of this concretion was compact and perfectly resembled the polypus-like concretions found in the heart and arteries, except that it was much firmer and drier, having evidently undergone incipient organization. It was white, with some shades of yellow and red, internally; and contained some small blood-vessels well formed and finely branched. Externally it was of a pretty deep violet red colour, and still more distinctly vascular. This concretion was no doubt the remains of a coagulum of blood which had been left in the bronchial cavity, after an attack of hæmoptysis, of which the patient had had several. Many other facts prove the possibility of the organization of fibrine when separated from the blood; and I shall myself have occasion to notice several of the kind, when treating of diseases of the organs of circulation. The *fleshy* uterine moles are of the same origin and character; only they approach, in appearance and consistence, nearly to fibrous textures. I am also of opinion that those *pieces of flesh*, which some of the older authors state to have been expectorated, were derived from this source.[†] This is evidently the case in those instances recorded by them in which the *flesh* was discharged during or subsequent to severe hæmoptysis,[‡] or where the concretions expectorated were of the form of a pulmonary vessel.[‖]

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* *Aqua Rabelliana*, so named from its inventor, the empiric Rabel: it is formed of three parts alcohol and one part sulphuric acid, and constitutes a sort of sulphuric ether.—*Transl.*

† A saturated solution of alum has recently been strongly recommended by Dr. Scudamore, as a styptic. See his work on the blood, p. 161.—*Transl.*

‡ *Murray*, Nov. Comm. Gœtting. IV. 44.—*Cheyne*, Ed. Med. and Surg. Journ. IV. *Horn*, Archiv. 1811, Jan. p. 176.

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[*] *Revue Medicale*, Mars 1824, p. 384.

[†] Act. Nat. Cur. vol. v. obs. lxxiv.

[‡] Comm. Litt. Norimb. 1745. p. 215.

[‖] Act. Nat. Cur. vol. vii. obs. xliv.—Tohn in Act. Erud. 1683. In this short chapter our author seems hardly to retain his accustomed correctness and clearness. He evidently confounds very different diseases under the same appellation. The *true polypus* of the bronchi, I mean of the same kind as the chronic growth of the nose, os uteri, and other mucous membranes, is no doubt an extremely rare disease; and M. Laennec commits a great mistake in ranking the case of Dr. Cheyne, as of this kind. It was an inorganized concretion analogous to that of croup, the result, no doubt, of a chronic inflammation of the bronchial membrane. Another variety of the bronchial polypus is that which follows hæmoptysis, and seems to be precisely of the kind described in the text as "a concretion found in a phthisical subject." For various examples of both these kinds, see Cheyne's Pathology of the Larynx and Bronchia, p. 147.—*Transl.*

CHAPTER VI.

ULCERS OF THE BRONCHI.

Ulceration of the bronchi is an extremely rare affection; although it would perhaps be less so, if we were more in the habit of examining the bronchi carefully and minutely. In this case, it is probable that we should occasionally find in phthisical subjects, in those more particularly where there existed a like affection of the larynx, ulcers of the mucous membrane of the bronchi,* the consequence of the small tubercles which now and then form in this membrane. The part of the bronchial membrane in which ulceration has been most frequently observed, is that comprised between the point where the trachea enters the thorax, and the bifurcation of the bronchi. M. Cayol was the first who gave an exact description of this affection, of which nothing was previously known, beside some examples noticed by Morgagni.†

Anatomical characters.—The size of the ulcers varies from a few lines to an inch and a half. They are of a greyish dirty colour, covered with a puriform mucus, generally in considerable quantity, with edges somewhat swollen and marked by a redness which extends to some distance around; and the bronchial rings and the muscular and ligamentous substance uniting these, are sometimes of the same colour throughout. They are rarely met with beyond the bifurcation of the bronchi.

Andral relates three cases of ulceration of the bronchi.‡ In the first, as in the cases of M. Cayol, the ulcers were near the bifurcation of the bronchi; in the second they existed in the small bronchial branches. In this last instance, the ulcerations of the size of a millet seed, were circular and with livid and tumid borders. The patient had been distressed by frequent and very painful fits of coughing; and his expectoration was usually tinged with blood. He died of aneurism of the heart. In the third case, the trachea from its origin to a little above its bifurcation, was literally like a sieve from an immense quantity of minute ulcers, so numerous and close indeed, that the space occupied by them was greater than the sound portion of the membrane. This disease had been attended by a sensation of habitual heat, rather than pain, in the trachea; and inspiration was accompanied by a remarkable hissing, occasioned probably by the continual tendency of the glottis to descend, on account of the irritation produced by the passage of the air. I know of no instance of complete perforation of a bronchial trunk, from ulceration, before entering the lungs. The author just quoted relates two cases of perforation of the trachea from this cause. In the one, the ulcer opened into the œsophagus, and was productive of no further inconvenience than a little uneasiness and cough when the patient swallowed; in the other, the opening was in the back part of the trachea; but it must have been either incomplete, or its edges must have been united to the neighbouring parts, as there appears not to have been any emphysema around it.

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* M. Louis's laborious and most minute researches have proved the correctness of M. Laennec's conjecture. Of one hundred and two phthisical subjects, the trachea was found ulcerated in thirty-one, the larynx in twenty-two, and the epiglottis in eighteen. In the whole of his researches he only met with seven cases of ulceration of the bronchi; but he adds, that this may have been somewhat more frequent, as he did not always examine the bronchi with the same care as the trachea. See his *Recherches sur la Phthisie*, p. 44. It would, however, appear from Dr. Hastings' observations, that ulceration of the bronchi is of much more frequent occurrence than even Louis supposes. In his account of chronic bronchitis he says—"It is not at all uncommon to find this membrane ulcerated. This happens more particularly when the disease has arisen from the irritation of mechanical substances. The ulcers are always superficial and generally small; but occasionally in the larger bronchial cells they are of considerable magnitude, and oblong or oval in shape. In the leather dressers of this town (Worcester) who died of chronic bronchitis, the mucous membrane is, according to the observation of the author, always ulcerated, and in those instances he has seen more extensive ulceration than in any other." *Treatise on Inflammation of the Mucous Membrane of the Lungs*, p. 281. See also cases 1, 2, 5, 8, 10, 11, 14, 15, 18, 21, 22; in all of which ulceration of the bronchial membrane is mentioned.—*Transl.*

† Recherches sur la Phthisie Tracheale, Paris, 1810.—De Sed. et Caus. L. ii Ep. 15.

‡ Clinique Med. tom. ii. p. 7.

Symptoms. These are—a pain, at first slight, or a simple feeling of irritation at the bottom of the trachea, experienced momentarily, and sometimes only when the patient sings, cries, or raises the voice in speaking. This state may continue a long time. I know a lady who has suffered in this way for ten years, without any other apparent alteration in her health. She had tried various means, and particularly the most powerful issues, without effect, and has only found relief in preserving absolute silence. After a time, the pain becomes constant, even when the patient is silent; and even then it is found that the voice is not always perceptibly altered in its character. Cough soon supervenes, attended by a colourless, ropy, pituitous expectoration, intermixed with opaque puriform particles. When this becomes abundant, a rhonchus, perceptible by the naked ear, is heard in the trachea; and when not so heard, I have found it very distinct by means of the stethoscope. This instrument detected it at the same time in various parts of the lungs, while in many points it discovered the respiration to be very feeble. This was owing probably to the accumulation of phlegm in the smaller bronchi, since the respiration became good after expectoration. These symptoms are soon accompanied by extreme dyspnœa, the patient being obliged to remain in the sitting posture night and day; and when he awakes after an imperfect sleep he is apt to be seized with a suffocating cough, as if some foreign body had got into the trachea; and this continues until after the expectoration of a certain quantity of mucus. At this stage, emaciation, which had hitherto been slow in its progress, makes rapid advances, and sometimes produces extreme extenuation; and the patient at last dies with all the symptoms of the suffocative catarrh.

Very great efforts of voice, acute cries, violent forcing of the head backwards, have sometimes appeared to be the occasional cause of the ulcers of the trachea. Cutaneous complaints and syphilis would seem also to pre-dispose to them. Although sometimes met with in phthisical cases, they are found more commonly in subjects whose lungs are entirely sound.[*] We must, however, except those cases where ulceration of the trachea or upper part of the bronchi is occasioned by the rupture of softened tubercles situated in one of the cervical or bronchial glands. But ulcers of this kind cannot be considered as at all of an idiopathic nature, being entirely analogous to those fistulous openings produced by the discharge of a tubercle, abscess, or gangrenous eschar of the lungs, into the branches of the bronchi. Ulcers of this kind have a great tendency to cicatrization, and are found after a certain time, smooth, polished, and without any appearance of spreading. The tracheal ulcer, on the contrary, appears to have no tendency to cicatrize, and I know of no well authenticated instance of the cure of this affection.

Treatment. The most obvious indication in this case is, unquestionably, the employment of local drains; and the most active ought to be had recourse to. Blisters and issues applied at a distance from the affected part, have never appeared to me of any use. What I have found most benefit from, is the repeated application of small moxas on the anterior and lower part of the neck, and the preservation of absolute silence by the patient.

CHAPTER VII.

ALTERATIONS OF THE COATS OF THE BRONCHI.

THE cartilaginous rings of the bronchi become occasionally ossified in old persons, and sometimes even in those less advanced in life, and they frequently become carious in the vicinity of ulcers. The ossification is rarely complete, being commonly of the earthy character, that is to say, with predominance of the earthy base of bone. In their natural state the bronchial ramifications have no cartilaginous rings, but they acquire this character when dilated and thickened: they may even become entirely cartilaginous or ossified, and this whether dilated or not. These degenerations are rare and usually very partial; and in them the mucous membrane remains healthy, surrounded with its bony or cartilaginous sheath.

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[*] This remark of our author appears, from the researches of Louis, already quoted, to be incorrect. He says—"In comparing the state of the epiglottis, larynx, and trachea, in persons dead of other diseases (chiefly chronic) beside phthisis, I have only found among one hundred and eighty cases, one ulceration of the larynx, and two others of the larynx and trachea conjointly. In the first case the patient died of peripneumony, and in the two last, the fatal disease was cancer or softening of the brain, but there were found tuberculous excavations in the lungs." When this statement is compared with that in the preceding note we seem justified in concluding, with this author, in direct opposition to M. Laennec, "that ulcerations of the larynx, and more particularly those of the trachea and epiglottis, are peculiar to phthisis." Op. Cit. p. 50.—*Transl.*

No perceptible alteration in the functions of the lungs is connected with this condition of the bronchi.

CHAPTER VIII.

OF FOREIGN BODIES IN THE BRONCHI.

MORSELS of food, pins, needles, pieces of wood, stones of fruits sometimes get into the bronchi. Violent irritation, convulsive cough, and, if the foreign body is large, threatening suffocation, are the immediate consequence of this accident, which is, nevertheless, unattended by any very pressing danger, unless the body introduced is sufficiently large to obstruct, more or less completely, the larynx or trachea. Cough, accompanied by a mucous or bloody expectoration, is the most usual symptom which supervenes to the accident; but even this soon passes off, particularly if the substance is small and falls down into a bronchial ramification; the organ becomes accustomed to the foreign body, and no inconvenience is produced by it.

Accidents of this sort arise from very various causes. I was myself witness to a very singular case of the kind. Professor Corvisart being desirous of exercising an unexpected supervision of some part of the clinical hospital, came to it one evening contrary to his custom, and suddenly entered the apartments of the steward, who had been indulging in a too plentiful repast. Taken by surprise, the man becomes sick at stomach, but making a violent effort to repress vomiting, he falls to the ground and expires. On examining the body, the larynx, trachea, and bronchi are found filled with half-digested food.

The ancient pathologists regarded foreign bodies introduced into the bronchi in a state of powder, as the cause of several severe diseases of those canals, as well as of the substance of the lungs; and among others, of phthisis pulmonalis, and the chalky concretions of the lungs, bronchial glands or bronchial tubes. This opinion appears to me altogether without foundation. It is imagined that stone-cutters and lapidaries are particularly subject to formations of this kind, occasioned by the inhalation of the dust amid which they work.

It is needless to remark that this dust is entirely unlike the cretaceous formations in the lungs. On this subject it deserves notice that stage coachmen, who spend their life amid much more dust, are usually healthy, or suffer only from diseases produced by intemperance and the inclemency of the weather. It is indeed singular how little sensible the mucous membrane of the bronchi is to solid matters when reduced to an impalpable powder, when we know that the introduction of a body only a little larger, such as a bit of sugar, or even of a gummy or albuminous fluid, occasions extreme irritation and cough. Every one is occasionally caught in a cloud of dust, and merely experiences, while breathing in it, an oppression without any inclination to cough. It is well known that when we have been for some time breathing an air loaded with dust or smoke, these foreign bodies are after a certain time expectorated with the mucous secretion of the bronchi.*

For these reasons I consider the chalky formations in the bronchi, as well as every accidental production in the living body, as the result of perverted secretion. These productions in the bronchi I have only met with in branches which are dilated, or in the vicinity of old tuberculous excavations cured by the formation of a fistula or cartilaginous cicatrice; and we shall find hereafter, when treating of phthisis, that the development of cretaceous matter frequently succeeds that of tubercles.

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* There can be no doubt of the correctness of our author's opinion as far as regards the production of cretaceous matters in the lungs; but it does not admit of question, that the habitual inhalation of dust of various kinds is a fruitful source of bronchial inflammation, among artisans, and more especially, in this country, needle grinders, leather-dressers, and, I can add from my own experience, *miners*. An immense proportion of the miners in Cornwall are destroyed by chronic bronchitis; one of the principal, though by no means the sole cause of which, I consider to be the inhalation of dust. See Ramazzini De Morbis Artif. Diatriba; also Ackermann's German, and Patissier's French translation, with additions, of this work. See also Dr. Johnstone's Paper on the Needle Grinder's Consumption; Mem. Med. Soc. vol. v.; Dr. Knight's Paper on Grinder's Asthma in the North of England, Med. Journ. vol. i.; and Dr. Darwall's Article on the *Diseases of Artisans*, in the Cyc. of Pract. Med. and Mr. Thackrah's treatise on the influence of the Arts on Health. See also Dr. Hasting's treatise already quoted, page 273, and cases 8, 9, 10, 11, 12, 13, for undoubted evidence of the powerful effect of the inhalation of dust. In page 300 he remarks—"The leather dressers and the workers in the china manufactories of this town are very frequently affected in this manner. They are relieved for a time by medicine; but the disease always destroys them if they do not quit their employment."—*Transl.*

CHAPTER IX.

OF DISEASES OF THE BRONCHIAL GLANDS.

These glands differ from all other lymphatic glands in being, in the adult, of a deep black colour, at least in their centre, and most commonly through their whole substance. The colouring matter is evidently united with the lymph. If a drop of this is applied to the skin and permitted to dry, the black spot produced is washed off with difficulty. This colour of the glands must not be considered as morbid, since it is found in subjects whose lungs are perfectly sound. The colouring material is obviously the same as the black pulmonary matter to be noticed hereafter.

Inflammation of the bronchial glands is very little known, and appears to be very rare. In cases of peripneumony these glands are pretty frequently enlarged, and of a pale red or slightly brownish hue, but not indurated. In a very few instances only have I met with abscess in them. This is the more remarkable, since lymphatic glands generally become affected from the inflammation of the organ with which they are connected being communicated to them.

There are two kinds of accidental productions very commonly met with in these glands, namely, cretaceous matter and tubercles. The former is usually situated in the centre, intermixed with the glandular substance. It is frequently so soft as to be forced out by pressure, and sometimes quite dry and hard. It very rarely involves the whole structure of the gland. I have never seen it with the character of bone. Most commonly it coexists with tubercle; in which case it occupies the centre of the gland, and contrasts, by its dull white colour, with the pale yellow of the tuberculous matter. Frequently both these substances, particularly the latter, are stained with black bronchial matter, as if it had been applied to the surface of the incised gland by a pencil or crayon. These stains point out the remains of the original substance of the gland amid the accidental productions which have usurped its place.

The tuberculous matter is more frequently found by itself; and is sometimes met with in these glands, when there are neither tubercles in the lungs nor marks of any severe affection of them. This is particularly the case in scrophulous children. The tuberculous matter is almost always disseminated through the substance of the glands; in very rare instances it is collected in isolated masses. Glands affected in this manner may reach the size of a pigeon's or hen's egg; and several are often united in one mass. These tubercles soften in two different ways,—by separating into two portions like cheese and whey, (in scrophulous subjects,) and by forming a thick flaky pus. The matter thus softened is either carried off by absorption, or opens into the bronchi. In this latter case, the gland sometimes remains excavated, lined by an adventitious membrane like the mucus, and forming one continuous surface with the inner tunic of the bronchi, the opening into which remains fistulous. M. Guersent, physician of the Children's Hospital, has met with this case pretty frequently, and has even known such fistulæ to communicate with the œsophagus.* They are very much rarer in the adult.

There can be no doubt that these cavities in the glands communicating with the bronchi, ought to yield pectoriloquy; but owing to the situation, it would be difficult to distinguish it from bronchophony, which I have stated to be extremely distinct, particularly in children, at the root of the lungs. If, however, the phenomenon were conjoined with a circumscribed cavernous rhonchus, the diagnosis would be nearly certain. The development of tubercles in a few of the bronchial glands, is of very slight consequence, provided the lungs or cervical and mesenteric glands are free from them.

Treutler, a German physician, discovered in 1789, in the bronchial glands of a phthisical subject, a new species of worm, which he denominated *hamularia lymphatica*, and of which he gives the following description: "One inch in length, of a fawn colour, spotted with white; body slender, roundish, flattened at the sides; head obtuse, with two prominent small tentaculæ, beneath."† It has not been met with since. This circumstance, taken in conjunction with the tentaculæ, might lead us to suppose that this author had mistaken the larva of some insect for an entozootic worm. Such a mistake might readily enough happen to a person not particularly conversant in helminthology, as was Treutler's case. In my early life I fancy that I committed a similar mistake, in describing under the name of *distomus intersectus*, and as a new species of worm, an animalcula which one of my patients conceived to have passed by stool, but which I now strongly suspect to have been merely the larva of some fly accidentally fallen into the night chair.‡

We are constantly observing in the medical journals cases which would lead us to imagine that nothing was more common than the degeneration of the bronchial glands into melanosis. When I come to treat of *melanosis of the lungs*, this subject will be more particularly noticed; I shall here content myself with repeating what has been already stated, and what has been long well known to anatomists, that the ordinary colour of the bronchial glands in the adult, is a black, more or less general and more or less deep.

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* Recherches sur une espèce de phthisie particulière aux enfans. Par M. Le Blond.—*Paris*, 1821.

† *Obs. Pathol. Anat. Leip.* 1793. ‡ *See Bull. de la Societe de Médecine.*

BOOK THIRD.

DISEASES OF THE LUNGS.

Previously to giving an account of the organic alterations to which the lungs are liable, it will be proper to take a view of the different opinions which have been published respecting the intimate structure of these organs. Malpighi conceived that the air cells were formed by the inner membrane of the bronchi being divided, previously to their termination, into cells like those of a sponge.[*] Helvetius fancied that he had ascertained by direct experiment, that the air cells were formed by a simple cellular tissue, disposed without any regular order, and derived from the cellular envelopes of the various vessels by which the lungs are traversed.[†] Haller entertained almost the same opinion, which is, indeed, that of the greater number of anatomists.[‡] Reisseissen, on the other hand, by means of a great many microscopical observations and mercurial injections, has ascertained that the bronchi, at their extremities, are subdivided into a multitude of small canals, terminated by culs-de-sac of a globular form, grouped somewhat in the manner of the terminal branchlets of the cauliflower.[§] A pupil of the Faculty of Paris, in his inaugural dissertation, published in 1823, has given an opinion altogether new respecting the structure of the lungs. He imagines that the principal bronchial trunk distributed in each lobule, before entering this, divides into two branches, each of these into two more, and so on successively, with a regular continuous bifurcation; by which means a still increasing series of canals are formed, which cross each other in every possible direction, and each of which is accompanied in its course by a twig of the pulmonary artery and veins. He imagines that these canals terminate, at the exterior of each lobule, in the cellular membrane which surrounds it, without being reflected and without anastomosing with one another.[||] The process by which he was led to this conclusion, consists in drying the lungs after they have been inflated, and then cutting them in slices, with a sharp bistoury. He asserts that in whatever direction the incision is made, we can perceive canals which are perpendicular, and others which are inclined to the surface of the incision. I have repeated this experiment without coming to the same conclusion. On the contrary, beside the very minute bronchial tubes distinguishable by their elongated form, I have always observed a great number of small vesicles, or what appeared to be such. Moreover, the process of insufflation and desiccation, however carefully performed, is always attended with a contraction or crisping, which diminishes the regularity of shape of the air cells and bronchial tubes, and prevents our seeing any thing very distinctly. Neither does the process of injection yield us results which are entirely satisfactory. It is well known, that whether we inject the bronchi, the veins, or the arteries, the matter of the injection always passes, more or less, into these three orders of vessels, and frequently leaves only a confused mass. However, I must admit that the most successful injections which I have made, have appeared to me to confirm the observations of Reisseissen; and that the character of the pulmonary structure, when examined in a state of hepatization, hæmoptysical induration, or emphysema, is much more in accordance with his ideas than with those of the others. It has also appeared to me, that in the process of insufflation the air penetrated the small blood vessels, a circumstance which may have tended to mislead M. Picard.

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[*] Epist. i. De Pulmone. Bolon. 1661.

[†] Mém. de l'Acad. des Sc. 1718.

[‡] Elémen. Physiol. t. iii. p. 171, et seq.

[§] *De Fabrica Pulmonum a Reg. Acad. Scient. Barolin, præm. ornata.* Berolini, 1822, in fol.

[||] Picard, *Dissertation sur la Pneumonie aigue.* Paris, 1823.

We may here observe, that the intimate structure of all the animal organs, is nearly as little within the reach of our eyesight or instruments, as is that of the lungs; and, consequently, that we ought to consider nothing as certain, in pathological anatomy, beyond those well-marked alterations of structure which fall within the cognizance of our senses, and which alter the organization of a part, in a way evidently incompatible with the exercise of its functions. To justify us in considering any organic alteration as the cause of disease or death, we ought, moreover, to be certain that the appearances presented to us have not been the result of decomposition after death, or of congestions which take place during the course of diseases, especially in the last agony, and which are susceptible of increase in the period immediately subsequent to death. If these principles are disregarded, and the causes of severe diseases sought for in mere microscopical alterations of structure, it is impossible to avoid running into consequences the most absurd: and, if once cultivated in this spirit, pathological anatomy, as well as that of the body in a sound state, will soon fall from the rank which it holds among the physical sciences, and become a mere tissue of hypotheses, founded in optical illusions and fanciful speculations, without any real benefit to medicine.

But, whatever be the intimate structure of the pulmonary tissue, if we examine, in a good light, the surface of a sound lung, we can ascertain by the naked eye, through the transparent pleura, that its parenchyma is formed by the aggregation of a multitude of small vesicles, of an irregularly spheroid or ovoid figure, full of air, and separated from each other by opaque white partitions. These vesicles, which on the surface of the lungs have the appearance of small transparent points, are not of an uniform size. The largest are equal to the third or fourth part of a millet seed. They are grouped in masses or lobules, divided from each other by partitions of closely-condensed cellular membrane, very thin, yet thicker and more opaque than the partitions between the individual cells. These partitions traverse the pulmonary substance in all directions, and crossing each other under various angles, form figures of different shapes, such as lozenges, squares, trapeziums, or irregular triangles. It is along the bounding lines of these figures, that the black pulmonary matter is deposited in greatest abundance, as I shall show more particularly when treating of *melanosis*, with which this substance is frequently confounded. I shall only remark in this place, that it is from this substance (which cannot be considered as morbid since it always is found in adult lungs) that the small black dots sometimes observed in the pearly sputa of the dry catarrh, are derived; as also the blackish or grey colour of certain kinds of mucous expectoration, and the greyish tint occasionally exhibited by the matter of pulmonary abscess, which resembles a mixture of pus and ashes. This black matter is not found in the lungs of young children. In adults and elderly persons it is more or less abundant; while in very old subjects it perhaps is found in less quantity. In the last-named class of persons the lungs present some other remarkable characters: the caliber of all their vessels seems diminished; they become in some sort exsanguine; the partitions of the air cells appear thinner than natural, on which account their substance, rendered more rare, becomes less elastic, and thus yielding to the atmospheric pressure on the opening of the body, they are found to occupy not more than one-third of the cavity of the pleura. They may be said to bear the same relation to the lungs of an adult, that muslin bears to a finer cloth, which is of a texture at once strong and close. These characters are especially observable in the lungs of octogenarians.

The black pulmonary matter is not the only cause which may so change the appearance of an organic disease of the lungs, as to render it occasionally a matter of some difficulty to recognize it in the dead body. The serous, sanguinolent, or sanguineous infiltrations, found toward the roots and posterior parts of the lungs, in almost every dead body, are a still more frequent source of mistakes. The infiltrations of blood vary much in degree and in appearance. Externally the lung, in the affected part, is of a violet colour more or less deep. In some points the colour is almost black, and when these points are exactly circumscribed, they may be mistaken by an inexperienced observer for gangrenous eschars; as I have actually seen happen in reports made in courts of justice. Internally, the pulmonary substance is gorged with a greater or less quantity of blood, and is more dense and less crepitous than natural. Frequently the contained blood appears half coagulated, and cannot be easily expelled by pressure; but it is not nearly so concrete nor so intimately combined with the pulmonary substance, as in the infiltration of hæmoptysis. If the examination has not been made until some time after death, and when the process of decomposition has already begun, the infiltrated parts become so soft, as, when pressed between the fingers, to resemble paste, of a brownish or deep violet colour. This last colour is particularly observable when the infiltration has commenced before death, and is combined with some degree of what I term *peripneumony of the dying*, to be noticed hereafter.

The kind of infiltration just described, is that observed in subjects whose blood-vessels and capillaries contain much blood, and particularly in those who have died of acute fever or scurvy. In exsanguine subjects, on the contrary, and particularly in such as have died of cancer, the infiltration of the same parts exhibits merely a simple red hue of the pulmonary substance, and does not render this at all less crepitous, or more disposed to pour out fluid when incised. In dropsical cases, in place of blood, there is frequently a very frothy serum, more or less tinged with blood. Sometimes this is nearly colourless; and in cases of this kind the state of parts sometimes closely resembles the first stage of peripneumony or œdema of the lungs, and, indeed, can only be distinguished from them by this circumstance,—that the diseases mentioned affect the lungs indifferently and without regard to the laws of hydrostatics; whilst the mechanical infiltration after death, is always most considerable in the lowest portion of the lungs.

Bichat was the first who called the attention of morbid anatomists to this circumstance: he pointed out its analogy with the dark-coloured marks observed on the back and under parts of the limbs of almost all dead bodies; and considered both as owing to the custom of placing them on the back. His opinion was founded on the experiment, which I have myself several times repeated, of placing the bodies on the belly immediately after death.

It is to be observed, however, that we sometimes see the dark stains above mentioned, on the posterior parts of the body one or two days before death, in patients who are extremely debilitated, and particularly in cases of severe fever. In like manner, the sanguineous or serous infiltration of the posterior part of the lungs, frequently commences several hours before death. From unwillingness to distress the dying, I have not ascertained the correctness of this statement in most cases; but I have done so in almost every case where I have made the experiment. A *sub-crepitous* and mucous rhonchus over the lower parts of the back and at the roots of the lungs, almost constantly accompanies the tracheal rhonchus of the last agony. It is in this way that we account for the oppressed breathing observable in most dying persons, even in cases where the organs of respiration have remained without any appearance of disorder through the whole course of the disease.*

CHAPTER I.

OF HYPERTROPHY OF THE LUNGS.

HYPERTROPHY or superabundant nutrition, is the most simple morbid alteration to which our organs are subject. It is indicated by increase of the size and sometimes of the consistence of the organic texture. It is productive of no inconvenience, unless it happens to affect a part, whose increased energy of action disturbs the equilibrium of the functions of the body. In certain cases it evidently results from the efforts of nature to remove disease; as in the instance of the lungs, and indeed in most double organs, such as the kidneys and testicles. When any one of these organs is destroyed, or from any cause rendered unfit for the performance of its functions, its fellow acquires a double energy, consequently an increase of nutrition, and, after a certain time, an augmentation of volume.

In the case of the lungs, it was observed by Morgagni, that in empyema with compression of the lung, the viscus on the opposite side was occasionally increased in size. The circumstance is indeed much more general than this author imagined; as it, in fact, occurs in every instance in which one of the lungs is rendered useless for a certain time,—a few months, for example. It is accordingly met with not only after empyema, but after pneumo-thorax, hydro-thorax, and, still more, after contraction of the chest, the consequence of severe pleurisy, or pulmonary excavations of a large size. In all these cases, the lung increases in volume, and becomes, at the same time, firmer, more elastic, and more compact. In place of collapsing when the chest is laid open, it sometimes protrudes from it, as if the space that contained it were too small. In instances of this sort it cannot be doubted that the air cells are enlarged, and that their parietes have acquired a preternatural thickness; although it is extremely difficult to prove this, even with the aid of the microscope.

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* The author seems here to overlook the gradual failure of the vital powers, as specially affecting respiration through the diminished energy of the muscles of respiration of the heart.—*Transl.*

Hypertrophy of the lungs is sometimes formed in a very short space of time: in the case of a man who had pleurisy and consequent contraction of the chest (to one-half its natural size) from rupture of a vast tuberculous excavation into the pleura, and who had the good fortune to survive this complicated malady, I found the hypertrophy existing in the highest degree, only six months after the invasion of the disease.*

Emphysema of the lungs, as we shall see hereafter, is also accompanied, in most cases, with hypertrophy of the pulmonary substance.

The same characters of firmness and elasticity in a perfectly crepitous lung, which I have before mentioned as belonging to hypertrophy of this viscus, are sometimes also observable immediately after the resolution of pneumonia. But in this case it is to be presumed that such qualities are only temporary, and depend upon an interstitial infiltration of serum.†

CHAPTER II.

OF ATROPHY OF THE LUNGS.

THE lungs belong to that class of organs which are unaffected, at least perceptibly, by general emaciation of the body. They diminish in size only from the effects of external pressure, or in consequence of the growth of accidental productions within their substance, which may be considered as exerting a pressure from within outwards. In the case of effusions into the pleura, particularly the purulent, the lungs are compressed against the mediastinum, and are sometimes reduced to a layer not half so thick as the hand. After the removal of effusions of less extent, they continue to adhere to the side, and hardly ever regain their original volume, even after the restoration of very perfect respiration. The same actual wasting of the pulmonary tissue, must be admitted in those instances in which a great number of tubercles or other accidental productions are developed in the lungs, without any condensation of the intermediate sound substance; and indeed we frequently observe that a lung which contains a vast number of tubercles is actually less than that of the opposite side, which contains a much smaller number. This remark was made by Bayle; but he went a little too far in drawing the conclusion from it that the chest of every phthisical subject is necessarily contracted.

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* This man was killed, shortly after his cure, by a blow on the head.—*Author.*

† For ampler details respecting hypertrophy and atrophy of the lungs, the reader is referred to Andral's *Precis d'Anatomie Pathologique*, t. ii. p. 514, et seq.; or to the translation of that excellent work by Townsend and West: they are omitted here, as having no direct bearing on practice.—*Transl.*

CHAPTER III.

OF EMPHYSEMA OF THE LUNGS.

THERE are two kinds of emphysema of the lungs, the *vesicular* or *pulmonary* properly so called, and the *interlobular*.

SECT. I. *Of vesicular Emphysema.*

This, next to hypertrophy, is the most simple of all the organic lesions of the lungs, since it consists simply in the dilatation of the air cells. On this very account it remained long unknown, and has not hitherto been correctly described by any author. I for a long time thought it very uncommon, because I had observed only a few cases of it: but since I have made use of the stethoscope, I have verified its existence as well on the living as the dead subject, and am led to consider it as by no means infrequent. I consider many cases of asthma, usually deemed nervous, as depending on this cause. The chief reason of this affection having been so completely overlooked is, that it is in some sort merely the *exaggeration* of the natural condition of the viscus.

Anatomical characters.—In pulmonary emphysema, the size of the vesicles is much increased, and is less uniform. The greater number equal or exceed the size of a millet-seed, while some attain the magnitude of hemp-seed, cherry-stones, or even French beans (haricot.) These latter are probably produced by the re-union of several of the air cells through rupture of the intermediate partitions; sometimes, however, they appear to arise from the simple enlargement of a single vesicle. The largest of these dilated cells are often in no respect prominent on the surface of the lung; sometimes they form a slight projection. In the latter case the structure of the lung acquires a striking resemblance to the vesicular lungs of the Linnæan order of Reptilia. Sometimes, though more rarely, we observe on the surface of the lung single vesicles, distended to the size of a cherry-stone or larger, quite prominent, exactly globular, and apparently pediculated. I say *apparently* pediculated, because on cutting into them we find that there is no real pedicle, but merely a constriction at the point where the cell begins to rise beyond the surface of the lung. The cavity of these dilated cells descends some little way into the substance of the viscus, and there its walls do not collapse, when cut, as in the projecting portion. At the bottom of this inferior portion of the cavity, we find small openings by which the dilated cell communicates with the adjoining ones, and with the bronchi. That these projecting vesicles are produced by the dilatation of air cells, and are not owing to the extravasation of air under the pleura, is proved, as well by the prolongation, just mentioned, of their cavity, into the pulmonary substance, as by the circumstance that we cannot force the contained air, by pressure of the finger, to leave its place and to pass under the contiguous pleura,—as would be the case if it were extravasated.

As long as the parts continue in the state above described, the disease consists merely in an excessive, permanent, and unnatural distension of the air cells, the air being still contained in its proper cavities; but when the distension becomes still more considerable, or takes place with greater rapidity, the air cells are ruptured in certain points, and the surrounding cellular substance of the lung becomes distended by extravasated air, exactly in the same manner as in emphysema of the subcutaneous adipose membrane. In this case we find on the surface of the lung vesicles of an irregular form, which can be made to change their place by pressure with the finger. They vary in size from that of a hemp-seed to that of a walnut, or even an egg. Like the simply dilated cells, these vesicles contain nothing but air, which makes its escape on their being punctured with a pin. Sometimes the air, though truly *extravasated* under the pleura, cannot be displaced by pressure in the manner just mentioned. This happens when the extravasation is situated at the point of re-union of the partitions which divide the different groups of air cells, as above mentioned. In this case the projection has usually a triangular shape and is not very considerable.

I have never found this extravasated air penetrate, to any considerable extent, into the substance of these interlobular partitions, nor into the cellular substance which surrounds the larger blood vessels and bronchial trunks; but I have seen the pulmonary substance in the interior of the lung lacerated by over-distension of the air cells. In these cases, over the site of the laceration we observe an irregular projection, on which the dilated cells are as distinct as elsewhere. Upon cutting into this, at a greater or less depth, we find the laceration of a proportionate size to the external projection. This is found to contain air, and sometimes also a small quantity of blood, either coagulated or loose; and the surrounding air cells, which form the immediate walls of the excavation produced by the rupture, are observed to be loose, flabby, and without their natural globular figure.

The bronchial tubes, especially those of a small caliber, are sometimes very evidently dilated in those portions of the lung where the emphysema exists. This fact is easily proved by comparing the diseased and sound portions of the lungs. It was to be expected; and, indeed, it is singular that the circumstance is not more common, since the cause which dilates the air cells must act equally on the bronchi; this dilatation is, nevertheless, very rare.

To enable us to have a correct notion of this disease, we must inflate the affected lungs and immediately dry them. If they are then cut into slices with a fine instrument, we perceive at once that the air cells are almost always more dilated than they appear externally; insomuch that those which form a projection on the surface, of the size of a hemp-seed, are found capable of containing a cherry-stone. We observe, moreover, that some of the cells are simply dilated, while others are ruptured, the intervening partitions of several being destroyed more or less completely.

When we blow into an emphysematous lung, the dilated and projecting cells seem to become flatter the more they are distended, and fall down to the general level of the surface. This is owing to the greater relative extensibility and elasticity of the healthy cells, which in the first instance rise to the level of the dilated cells, and then fall below them, to their natural level. The continued projection of the dilated cells may be partly owing, also, to the difficulty with which the air escapes from them, more especially when the exciting cause of the emphysema is the dry catarrh.

Emphysema may affect both lungs at the same time, one only, or a part of one or of both. In the latter case,—and indeed in any case, as long as there do not exist vesicles of considerable size on the surface of the lungs,—it is easy to overlook the disease in the dead subject, and, as I have already said, I am convinced that this has often been done by the best practical anatomists as well as by myself. I am now well assured, that if we carefully examine the lungs of the subjects who have long suffered from the dyspnœa, from whatever cause, we shall almost always find more or fewer of the air cells dilated. In lungs studded with tubercles, which presented no other sign of emphysema, I have sometimes found two or three of the cells dilated to the size of a hemp-seed.

When the disease exists in a high degree, and occupies the whole of one or both lungs, we cannot help being struck with the appearance of the parts. The lungs seem as if confined in their natural cavity, and, when exposed, instead of collapsing as usual, they rise in some degree, and project beyond the borders of the thorax. If we examine them in this state, they feel firmer than natural, and it is more difficult to flatten or compress them than in ordinary cases. The crepitation they afford on pressure, or on being cut into, is less, and of a kind somewhat different; it is more like the sound produced by the slow escape of air from a pair of bellows; and the air makes its escape from the cells much slower than in a healthy state of the organ. When we detach the lung, the crepitation is found to be still less perceptible, and the sensation conveyed by pressing the parts is very like that produced by handling a pillow of down. This seems to indicate either a more difficult communication between the air contained in the air cells and that in the bronchi, or else a diminished elasticity of the air cells themselves. Perhaps both these causes conspire to produce the effect in question. The first clearly exists in a great number of cases; since we know that the dry catarrh, and the obstruction of the lesser bronchi, an attendant on the dry catarrh, are the most common causes of emphysema. The second cause indicated is equally probable, inasmuch as the thickening of a membrane is a very frequent result of its habitual distension, and, in the present case, it appears that the state of emphysema is productive of a certain degree of hypertrophy. On placing an emphysematous lung in a vessel of water, it sinks much less than a healthy lung; sometimes it floats on the surface with scarcely any obvious immersion. The pulmonary tissue is drier in a lung affected with emphysema than in a healthy one; and it is unusual to find, even towards the roots of the lungs, any trace of the common serous or sanguineous infiltrations commonly found after death. The contrary, however, sometimes happens, as will be seen in the cases about to be detailed. A history of what appears another instance of this complication is recorded by M. Taranget.[*] In cases of this kind, as in most others in which considerable infiltrations of the pulmonary substance are found after death, it is probable that the infiltration took place only a few moments before the cessation of life. Be this as it may, it is certain that this mechanical engorgement, as well as œdema properly so called, and also peripneumony, render it sometimes a matter of difficulty to recognize emphysema, when not very extensive, in the dead body. When a single lung is affected, it becomes much more voluminous than the other—so much so, indeed, as sometimes to pass aside the heart and mediastinum, and to cause an evident enlargement of the bony walls of that side of the chest.

From these observations it results, that pulmonary emphysema consists essentially in the dilatation of the air cells, and that the *extravasation* of the air on the surface of the lungs, constituting the larger and more prominent vesicles, is a posterior affection, and not necessarily connected with the disease in question.[*] The latter species of lesion is, moreover, of slight consequence compared with the dilatation of the cells, as we can hope for its removal by absorption, as in other similar cases; whilst we cannot well see in what manner either nature or art can remedy the other morbid derangement. At the same time, I do not think we are justified in considering this affection as altogether incurable. In several instances I have fancied that I discovered the traces of cicatrization of ruptures of the pulmonary tissue, of the kind above described. In the case of subjects affected with asthma, I have several times, during the fits, detected a crepitous rhonchus with large bubbles, in particular points, which rhonchus entirely disappeared afterwards; and it is quite intelligible that if we can diminish the intensity of the cause which keeps up the habitual distension of the cells, we may in the end hope that these will be actually lessened in volume.

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[*] Recueil. Period. de la Soc. de Méd. de Paris, tom. xi. p. 375.

The emphysema of the lungs, of which I have just given the description, appears to me, as I have already observed, to have been hitherto unknown. No general description of it certainly exists; although facts, that evidently can be only referred to it, are to be found in several authors. Bonetus[†] and Morgagni[‡] give several examples of the lungs being found very voluminous and distended with air. Van Swieten[§] and Storck[‖] have some cases wherein vesicles of air were found under the pleura: and Floyer[¶] noticed the same thing in a broken-winded mare. The author of the article *Emphysème* in the Dict. des Sciences Méd. relates a case precisely similar to these last mentioned, which had been communicated to him by M. Majendie; but none of these various authors appear to have been acquainted with the real character of the affection, viz.—dilatation of the bronchial cells.

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[*] This proposition is, however, now much disputed. Andral regards the phenomena described as vesicular emphysema by Laennec, as merely hypertrophy or atrophy of the lungs, and recognises no other species of pulmonary emphysema, but that which our author terms *interlobular*. (*Précis d'Anat. Path.* t. ii. p. 530.) This is also the opinion of M. Piedagnel, (*Recherches sur l'emphysème du poumon*, Paris 1829,) who, moreover, contends that this species of emphysema exists in every case in which the lungs are found *crepitant*, or yielding the crepitous sound on compression. It is, however, evident from M. Piedagnel's own observations that there is, in reality, in the greater number of cases, a dilatation of the air cells antecedent to the extravasation of the air in the interlobular tissue of the lungs: I conceive, therefore, that his opinion does not differ materially from that of Laennec which he combats; the latter having never pretended that the emphysema consists *exclusively* in dilatation of the air cells.—(*M. L.*)

[†] Sepulchret. lib. ii. sect. 1.

[‡] Epist. iv. sect. 24. et Epist. xviii. sect. 14.

[§] Comment. in Boerh. aph. 1220.

[‖] Ann. Med. Prim. p. 114. Ann. Med. Secund. p. 239.

[¶] Treatise on Asthma.

All of them seem to have thought, with the last-mentioned writer, who expresses his opinion in a positive manner, that the derangement in question consisted in the infiltration of the cellular substance of the lungs with air. Ruysch and Valsalva are the only authors, as far as I know, who have observed, in individual cases, the dilatation of the cells. The case noticed by the latter is an example of partial emphysema of the lungs complicated with empyema. It has been noticed under its latter character by Morgagni, who does not appear to have understood the nature of the former change of structure. This, however, he has described in a manner to leave no doubt of its true nature. "Sinistri pulmonis lobus superior . . . . . . quâ claviculum spectabat, vesiculas ex quibus constat mirum in modum auctas habebat; ut nonnullæ avellanæ magnitudinem æquarent; cætera multô minores erant. Quædam globuli figurâ, reliquæ oblongâ et ovali: omnes plenæ erant aeris . . . . una insuper minim aquædam foraminula per interiorem faciem hiantia ostendit."*

The case noticed by Ruysch is also one of partial emphysema of the lungs: "In aliquâ autem pulmonis parte inveni vesicularum pellucidarum acervum, ab aere expansarum et ita obstructarum ut levi compressione eas ab aere evacuare haud potuerim. Impulsum per asperam arteriam flatum nullum commercium cum hisce expansis vesiculis ampliùs habere propter earum obstructionem expertus sum. Post aere per asperam arteriam vehementer adacto disrumpebantur nonnullæ ex his vesiculis."† This author has, perhaps, a second case of the same kind, (obs. 20,) but it is too imperfectly described to justify any deductions from it.

Dr. Baillie, author of the Morbid Anatomy, has correctly observed the three principal circumstances which constitute emphysema of the lungs, namely—the great size of these organs,—the dilatation of the cells,—and the vesicles formed by the extravasation of air under the pleura; but he does not appear to have been acquainted with the mutual dependence of these three states, and describes them as three different affections, as is evident from the following passages which contain all that he says on this subject.

"*Lungs distended with air.* In opening into the chest, it is not unusual to find that the lungs do not collapse, but that they fill up the cavity completely on each side of the heart. When examined, their cells appear full of air, so that a prodigious number of small white vesicles are seen upon the surface of the lungs immediately under the pleura. The branches of the trachea are often at the same time a good deal filled with the mucous fluid. This fluid had probably prevented the ready egress of the air, so that it had gradually distended the air cells of the lungs, and had prevented the lungs from collapsing."

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* De Sed. et Caus. Morb., lib. ii. epist. xxii. 12 et 13.

† Ruysch, Obs. Anat. Centur. obs. xix.

"*Air cells of the lungs enlarged.* The lungs are sometimes, although I believe very rarely, formed into pretty large cells, so as to resemble somewhat the lungs of an amphibious animal. Of this I have now seen three instances. The enlargement of the cells cannot well be supposed to arise from any other cause, than the air being not allowed the common free egress from the lungs, and therefore accumulating in them. It is not improbable also that this accumulation may sometimes break down two or three contiguous cells into one, and thereby form a cell of a very large size."

"*Air vesicles attached to the edge of the lungs.* Vesicles containing air have occasionally been seen attached to the edge of the lungs. They do not communicate, however, with the structure of this organ, but are complete in themselves. Upon the first view, it might be thought probable that they were merely some of the air cells enlarged; but as they do not communicate with any of the air cells, this opinion is not well founded. It is most likely that they are a morbid structure, formed in the same manner as the air vesicles attached to the intestines and mysentery of some quadrupeds, and that the very minute blood vessels which ramify upon the vesicles, have the power of secreting the air."*

He afterwards adds, (p. 86,) "When the cells of the lungs are much enlarged in their size, persons have been remarked to have been long subject to difficulty of breathing, more especially on motion of the body; but I believe no symptom is at present known, by which this disease may be ascertained from some others incident to the chest."

Occasional causes. Pulmonary emphysema supervenes almost always to an extensive and severe dry catarrh; and nearly all the subjects of asthma from the last-named disease, on examination after death, exhibit a greater or less dilatation of some of the bronchial cells. These facts lead us to a simple explanation of the mechanism of dilatation of the air cells. It has been already shown that, in the dry catarrh, the smaller bronchial tubes are frequently completely obstructed, either by the pearly sputa or by the swelling of their inner membrane. Now since the muscles of inspiration are numerous and powerful, while expiration, on the other hand, is produced merely by the elasticity of the parts and by the feeble contraction of the intercostal muscles, it must frequently happen that the air, which during inspiration had overcome the resistance opposed to its entrance by the tumid state of the bronchial membrane and the sputa, is unable to force the same obstacles during expiration, and remains therefore imprisoned in the cells, by a mechanism somewhat similar to the valve of an air gun. The succeeding inspirations, or at least such of them as are energetic, introduce a fresh supply of air into the same cells, and thereby necessarily occasion their dilatation: and provided the obstruction is of some continuance, the dilated condition of the cells will be rendered permanent. The increased temperature and consequent dilatation of the air, after it is received into the lungs, will have some effect also in distending the containing cells.[*] It follows from this view of the matter, that the dry catarrh tends as naturally to the production of emphysema of the lungs, as the chronic mucous catarrh leads to dilatation of the bronchi.

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* Morbid Anat. 5th ed. p. 78, et seq.

I have, however, some reasons for believing that, in certain cases, the dilatation of the cells is the primary affection, and the catarrh consecutive. In the case of persons suffocated by the gases of cess-pools, I have remarked the lungs to be very large, and to remain dilated when the chest was laid open, although perfectly crepitous. Is this owing to a general dilatation of the air cells?[†]

Certain other occasional causes may excite this disease, such as the long retention of the breath in the case of players on wind instruments. The same remark applies to violent efforts of any kind which cause the long-continued retention of the breath; but these, as we shall see hereafter, give occasion, still more frequently, to the interlobular emphysema.

Among the rarer causes of the same disease may be reckoned all those which strongly compress the large bronchial trunks, such as tumours in the bronchial glands or mediastinum, aneurisms of the aorta, polypi of the bronchi, &c.; and under the same head may be classed large tumours developed in the lungs themselves, such as cysts or tubercles. It is by no means unusual, in lungs filled with tubercles of a pretty large size, to find some of the air cells dilated in different points. We shall find hereafter that a spasmodic stricture of the bronchi is a frequent attendant on dry catarrh; and this must contribute to the production of emphysema.

Signs and symptoms. Both the local and general symptoms of pulmonary emphysema are rather equivocal. Dyspnœa being its principal feature, it is usually confounded under the name of *asthma*. The difficulty of breathing is constant, but is aggravated by paroxysms, which are irregular both in the period of their return and their duration; it is likewise increased by all the causes which usually increase dyspnœa, from whatever source arising; such as the action of digestion, flatulence in the stomach or bowels, anxiety, living in elevated situations, strong exercise, running, or ascending a height, and, above all, the supervention of an acute catarrh. There is no fever, and the pulse is generally regular. In slight cases the complexion and habit of the body are little altered; but when the affection is more considerable, the skin usually assumes a dull earthy hue, with a slight shade of blue here and there. The lips become violet, thick, and look swollen. In every case that I have met with, there existed an habitual cough. Sometimes this was infrequent, slight, and either dry or attended with a trifling expectoration of a very viscid greyish and transparent matter; at other times, it was more severe, returning in paroxysms, and accompanied by the usual mucous expectoration. In some instances the patients denied having either habitual cough or expectoration: but on watching them carefully, it was found that they coughed slightly, at least once or twice daily, and expectorated every morning a little of the viscid bronchial mucus above mentioned.

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[*] I gave this explanation of the phenomena to the Royal College of France in the scholastic year of 1823-24: on which occasion one of my pupils, M. Legallois, suggested, that part of the phenomena of expiration might be explained by the necessary increase of volume (in the lungs) of the inspired air.—*Author.*

[†] If the opinion noticed in the preceding note be founded in truth, and I think the explanation must be admitted to a certain extent, it will follow that asphyxia from carbonic acid gas ought more especially to give rise to this dilatation of the cells, since it will be expired with more difficulty, on account of its greater specific gravity.—*Author.*

This disease begins frequently in infancy, and may continue a great many years. It does not always prevent the subjects of it from attaining an advanced age; although it must be admitted that the influence it may have in unfavourably modifying other accidental diseases, must very considerably diminish the probabilities of life. The constant and frequently very great efforts which the patient is obliged to make during respiration, often, at last, give rise to hypertrophy or dilation of the heart.

When the emphysema is confined to one lung, or is much greater in one than the other, the side most affected is perceptibly larger than the other; its intercostal spaces are wider; and it yields a clearer sound on percussion. If both sides are affected equally, the whole chest yields a very distinct sound, and instead of its natural compressed shape, it exhibits an almost round or globular outline, swelling out both before and behind. This conformation of the chest is sufficiently remarkable to have enabled me sometimes to announce the existence of emphysema from simple inspection.

The pathognomonic signs of this disease are furnished by a comparison of the indications derived from percussion and mediate auscultation. The respiratory sound is inaudible over the greater part of the chest, and is very feeble in the points where it is audible: at the same time, a very clear sound is produced by percussion. From time to time also, we perceive, while exploring the respiration or cough, a slight sibilous rhonchus or sound of the valve, as in the dry catarrh, occasioned by the displacement of the pearly sputa. So far, indeed, these signs are merely those formerly described as indicating the dry catarrh, to which, as we have already seen, this disease is almost always owing. In doubtful cases, the long continuance of the disorder, the severity of the habitual dyspnœa, and the asthmatic paroxysms occasionally occurring, will suffice to point out the existence of emphysema in some parts of the lungs. These indications will be strengthened by the existence of extreme indistinctness of the respiratory sound generally, and by its entire absence in certain points; characters which might be expected to be much more marked in this affection, than in the simple dry catarrh, owing to the compression of the neighbouring cells by those which are dilated. The cylindrical form of the chest, and the slight lividity of the skin, will also help the diagnosis. In the case of one lung being principally affected, the augmented sonorousness and increased size of this side will discriminate the disease from all others, except pneumo-thorax, from which likewise, as will be shown when we come to treat of that disease, it can be readily distinguished. When existing in a high degree, this disease may, in the last place, be recognized by a sign which is altogether pathognomonic, and which I have described in Part First under the name of the *crepitous rhonchus with large bubbles.* In this case, the sound during inspiration or coughing, is like that which would be produced by blowing into half-dried cellular substance. It differs from the common crepitous rhonchus, in conveying the notion of dryness, and also as being connected with bubbles which are at once large and unequal, the other rhonchus having qualities exactly the reverse. This phenomenon is however not common, and when it exists, it is of very short duration, and is observed only in points of small extent. It is much more common and more permanent in the interlobular emphysema. In some instances the patients have been sensible of a crackling in the spot where this rhonchus was heard; and still more rarely I have perceived, in thin subjects, a crepitation in the same place, when pressing it externally with the finger.*

Progress of the disease. The organic lesion at present under consideration commonly follows an attack of acute dry catarrh when supervening to a chronic affection of the same kind; and the repeated return of these acute attacks, gives rise to most of the cases of dry asthma. Asthmatic paroxysms of this kind are accompanied by an an extreme oppression, which, however, does not always prevent the patient from assuming the horizontal posture. If fever accompanies the attack of catarrh, the oppression becomes less; and if a little pituitous or mucous expectoration comes on, the asthmatic paroxysm soon terminates, and the breathing becomes sometimes freer than before: in this case it would seem as if the viscid mucus which usually obstructs the bronchi, became less tenacious, or was carried off by the more liquid and less adhesive secretion produced by the recent catarrh. If, on the other hand, the recent catarrh brings no alleviation, the asthmatic attack is of long continuance, and the patient only slowly returns to his ordinary state, and even not unfrequently remains more habitually oppressed than before. The severer asthmatic paroxysms occur only after very long intervals, during the first years of the disease;—the greater number of the catarrhal affections producing merely a slight and temporary increase of the usual dyspnœa. But when the complaint is of long standing and the patients far advanced in life, the paroxysms become more frequent and severe. Each succeeding attack increases the extent of the organic lesion; and rupture of the pulmonary tissue, and sometimes interlobular emphysema, then ensues.

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* The circumstances mentioned in the text, coupled with the fact that it is heard continuously in the interlobular emphysema, clearly demonstrate that the *dry crepitous rhonchus* or *crackling*, only exists at the moment of rupture of the air cells; and it is extremely probable that it is produced by this accident and the consequent extravasation of the air into the surrounding cellular substance. It is, however, by no means allowable to explain, in the same manner, the obscure sibilous rhonchus or sound of the valve or click, also perceptible in the pulmonary emphysema; as this admission would necessarily involve the belief of the laceration of the air cells in the case of catarrhs, in most of which this clicking is perceptible at their onset."—(*M. L.*)

From the preceding observations it must be concluded, that pulmonary emphysema, in a middling degree, is not a disease of great severity. Of all the varieties of asthma it is unquestionably that which affords to the patient the best prospect of long life. The long continuance and slow progress of the disease and the nature of its causes, render it possible to struggle against the organic lesion, and permit the functional disorders resulting from it to be kept within tolerable bounds.*

* In Sir John Floyer's "Treatise of the Asthma," Lond. 1698, referred to in a preceding page, there is a fuller and more distinct account of the organic lesion treated of in this chapter, than our author seems to be aware of. It is true, the lungs examined by Sir John were those of a *mare*, but he evidently considers the remarks he makes, as applicable to the human subject. Contrary to the assertion of Laennec, this author expressly notices the *dilatation* of the air cells; and in several passages (see p. 239—247) he seems to entertain ideas relative to the causes and effects of this lesion very similar to those of M. Laennec. Sir John notices the same affection as existing in hawks, and being the cause of the disease in them termed the crocke, a kind of dyspnœa produced by overstraining in flying, (Phys.'s, pulse watch, vol ii. p. 400.) Making allowance for the antiquated phraseology, the following piece of pathology comes very near our author's: "As it happens in external flatulent tumours, they at first go off and return, but at last fix in permanent flatulent tumours; so it is in the flatulent asthma, the frequent nervous inflations induce at last a constant windy tumour or inflation; and it ought to be considered how far holding the breath in hysteric fits, or the violent coughing in long catarrhs, or the great distension of the lungs by an inflammation, may strain the bladders, and their muscular fibres, and thereby produce the same rupture, or dilatation, or hernia, as happens in the broken-winded. This must be observed by the help of the microscope; and if the air blown into the lobe will not be expelled thence by the natural tone or muscle of the bladders, that the lobe may again subside of itself, 'tis certain some injury is done to the ventiducts; the bladders are either broken, and admit the air into the membranous interstices, or else they are over-distended, like a hernia in the peritoneum; and this will produce an inflation of the whole substance of the lungs, and that a continual compression of the air and blood vessels, which will produce a constant

Treatment. Emphysema of the lungs being almost always the consequence of the dry catarrh, presents the same indications of cure as were pointed out when treating of that disease. Frictions with oil are often very useful in lessening the susceptibility to be affected by catarrh. In the case of pallid cachectic subjects, the subcarbonate of iron has occasionally seemed to have a similar effect, and to tend at the same time, to diminish the congestion of the mucuos membrane, and also the spasmodic stricture of the bronchi. In the severer asthmatic paroxysms, it is frequently necessary to have recourse to venesection, in order to relieve the congestion of blood in the lungs; and it is always proper to diminish the necessity of respiration by means of narcotics.*

The following cases will furnish examples of most of the facts stated in the preceding pages:

CASE V.—*Partial emphysema of the lungs.* A woman, aged fifty, came into the Necker Hospital in December 1818, affected with great dyspnœa, cough, strong action of the heart, anasarca of the extremities, &c. which were said to have existed three weeks. She died the same night. On examination, the lungs

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asthma."—(*Treatise on Asthma*, p. 244.)—Pulmonary emphysema is noticed in the recorded dissections of many of the older authors. I will here refer to a few: Bonetus, Sepulchret. lib. ii. sect. i. obs. 54, 55, 56, 57, 58; Ruysch, obs. 19, 21; Morgagni, Ep. iv. 24. xviii. 14; Ridley, obs. p. 219—234, Lond. 1763; sir W. Watson, Phil Tr. Abr. xii. 145; Heberden, Comment. p. 63.

It is evident that the disease in horses termed *broken-wind*, as we find it detailed in our best veterinary works, is precisely the same organic lesion as that described in the text; although I have not met with any one, except Floyer, who noticed the *dilatation* of the cells. In an article on "Broken-wind" in Rees's Cyclopedia, the disease is well described, and the morbid condition of the lung is there termed *emphysema.* Several dissections of this disease are given in Mr. Percivall's "Lectures on the Veterinary Art;" and in one of these the author states that "the bronchial and tracheal membranes, though of their natural colour, were *much thickened*;" and justly adds, that if this appearance is constant, it will throw much light on the pathology of broken-wind. (vol. ii. p. 357.)—The pathology of *broken-wind* in horses, has been since more accurately investigated by Andral. His examinations of lungs in this state have presented to him the three species of lesion described by Laennec—1, simple dilatation of the small bronchi and air cells; 2, rupture of the walls of these; 3, infiltration of the air into the interlobular cellular tissue;—each being the consequence of the other in the order stated. M. Andral very naturally asks, may not the pulmonary emphysema be produced in the same mechanical manner in man from severe and long-continued coughs? may not the temporary distension of the air cells by air or mucus give rise to their permanent dilatation? and replies—that all that is necessary to insure this result is that the elastic power naturally inherent in the air cells should be overcome and destroyed. (*Précis d'Anat. Pathol.* t. ii. p. 526). These views accord precisely with those of Laennec.—*Transl.*

* The following notable proposal for curing emphysema of the lungs, seems worthy of record in this place, as a striking illustration of the absurdities into which even the most sensible practitioners could be led, before the physical researches of the moderns had redeemed pathology from the dominion of metaphysical theory: "The cure of the broken wind," says Sir John Floyer, "cannot easily be projected any other way but by a paracentesis in the thorax; for if the external air be admitted, it will compress the flatulent tumour, and through the same hole a styptic and carminative hydromel may be injected, to restore by its stypticity the tone of the membranes, and discuss by its aromatic acrimony the windy spirits, or air retained in the lungs."—*Treatise of the Asthma*, p. 216.—*Transl.*

were found free from adhesions, voluminous, and lighter than usual. A large portion of the right lung and almost all the lower lobe of the left, were smooth and shining, yet somewhat irregular on the surface; and they collapsed much less than the other parts. On the surface of these portions, there was a great number of transparent vesicles, of the size of a millet or hemp-seed, and some as large as cherry-stones;—the former being level with the general surface, the latter somewhat prominent. Upon inspecting these vesicles closely, they were found to be the air cells in a state of dilatation. The cells around these, and indeed over the whole of the lung that remained uncollapsed, were more distinct than is usual, and gave the parts so affected a resemblance to the vesicular lungs of cold-blooded animals. In two or three points there were bubbles of air of the size of a small filbert, extravasated beneath the pleura. These were readily distinguished from the dilated cells, by being easily displaced by pressure. On compressing those portions of the lungs where the cells were dilated, the resistance afforded by them was softer, and the sensation communicated was unlike the natural crepitation usually perceived. The air in escaping from these parts produced a gentle hissing. On puncturing them they collapsed, and lost the appearance above described. In other respects, the substance of the lungs was sound. The bronchi, particularly the smaller branches, in the affected parts, were perceptibly dilated, of a deep red colour, and filled with a very viscid and nearly colourless mucus.

CASE VI.—*General emphysema of the lungs.* J. B. Cocard, aged 37, came into the Necker Hospital in May 1818. He had been subject to habitual cough, and mucous expectoration, ever since he was three years old. He had likewise dyspnœa, but never sufficient, in the early part of his life, to prevent him from following his occupations as a labourer, except in winter, when he was always confined to bed for some days, on account of the increase of his cough. In his thirty-third year, he had hæmoptysis, which had no further immediate consequences; and it was not till three years afterwards that dropsical symptoms made their appearance. When he came into the hospital, on the 25th of May, there was anasarca of the abdomen and lower extremities, the lips were bluish, the respiration short and much oppressed, frequent cough, with pituitous expectoration, pulse frequent and regular, and the skin of natural temperature. The chest sounded every where very well. The sound of respiration could be perceived with difficulty immediately below the clavicles, and was altogether imperceptible over the remaining parts of the chest; except that, now and then, one could for a moment fancy that he heard it, at which times it was accompanied by a slight sibilous rhonchus, like the clicking of small valves placed in the bronchi. The chest, both before and behind, was remarkably rounded and prominently arched. The heart yielded both a slight impulse and sound. After a short stay in the hospital, the dropsical symptoms were removed, and he went out on the 9th of June. On the first of the following month, however, he returned, in the same state as when first admitted. At this time, I was led, from considering as well the symptoms present, as the absence of others, and from comparing the case with some which I had recently seen, to come to the conclusion that the disease was *general emphysema of both lungs*. The dropsical state was again relieved by diuretics, and he left the hospital on the 19th, affected merely with his habitual cough and dyspnœa. During the whole time he remained in the hospital, the stethoscope never detected the sound of respiration, except very feebly in a few varying points of the chest, particularly between the clavicle and third rib. This man returned once more to the hospital in September, with the pectoral symptoms as before, and with the addition of severe diarrhœa. He was getting better of this, when he was seized with small-pox, and died about three weeks after his admission into the hospital.

Dissection twenty-four hours after death. The heart was double its natural size, both ventricles being dilated and thickened. Both lungs were found without any adhesions, filling completely the cavity of the chest, and not at all collapsing on the admission of the external air. Their surface was smooth, shining, drier than natural, and seemingly unctuous. The upper lobes presented on their surface some transparent vesicles, varying in size from that of a filbert to that of an almond, and even a walnut, and evidently produced by the extravasion of air under the pleura. The specific gravity of the lungs was at least one-half less than natural. When placed in water, they hardly dipped even a few lines into the fluid. When compressed in the hand, the sensation communicated was rather that of the displacement of an elastic fluid, than the natural crepitation of the viscus. When cut into, the air made its escape with a slight hissing. The substance of the lungs was drier than natural, except in some spots near their centre and roots, which were less emphysematous, and from which there flowed a little frothy and bloody serum. The pulmonary substance was in other respects sound.*

CASE VII.—*Slight emphysema.—suffocative catarrh and slight peripneumony.* A man, of delicate health in childhood, and affected with spinal curvature, in his twenty-eighth year became subject to slight cough and habitual dyspnœa. Two years afterwards he caught a severe cold, with much aggravation of his former symptoms, and came into the hospital in January. At this time the following report was made of the case: Thorax prominently arched and almost cylindrical anteriorly; the patient keeping himself nearly in a sitting posture in bed; the trunk inclined forwards; heat of skin moderate; respiration high and short; cough in fits; expectoration of a ropy frothy mucus; cheeks, lips and nails of a violet colour. The chest yielded a very clear sound throughout except on the lower part of the right side behind, where there was hardly any. The respiration was just barely perceptible over the whole left side, and was accompanied with a slight degree of rhonchus, sometimes mucous and sometimes sibilous. The upper part of the right side afforded the same results; but on the lower part, there was a slight crepitous rhonchus without any of the natural sound of respiration. The pulsations of the heart were feeble and indistinct. The pulse was weak, not very quick, and slightly intermittent. The external jugulars were swollen but without pulsation. DIAGNOSIS: *Emphysema of the lungs, with suffocative catarrh and slight peripneumony of the lower part of the right lung.* He died on the following day.

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* The state of the air cells is not noticed in this case, the gentleman who made the examination being at the time unacquainted with this particular lesion. Upon being shown afterwards lungs decidedly emphysematous, he admitted that they exhibited a precisely similar appearance to those in the present subject.—*Author.*

Dissection thirty-six hours after death. The left lung filling completely the cavity of the chest, and projecting beyond the mediastinum, yielding to the touch a sensation intermediate between that afforded by a bladder half filled with air, and the natural crepitation of the healthy viscus. The air cells, evidently enlarged over the whole surface of the lung, had the same appearance to the naked eye as the healthy cells present under the microscope, the largest being of the size of a grape-stone, and the smallest of the size of a millet-seed. Their shape was globular or ovoid. On different points of the surface there were also many small extravasations of air beneath the pleura, three or four times as large as the dilated cells, but not more prominent than them. On cutting into them, they were found capable of containing a hemp-seed or even a cherry-stone. The substance of the lungs was less crepitous than natural, when cut into, and was extremely dry. The bronchi were larger than natural, very red, and filled with white ropy mucus. The right lung exhibited the same appearances as the left, in the upper and middle lobes; but the lower lobe was indurated, and posteriorly it was as hard as liver. In this point it was of a violet red colour, intermixed with yellowish spots, and looked granular when incised. Above this spot, and anteriorly, it was still somewhat crepitous, though much gorged with blood and sanies. The other organs were sound.

CASE VIII.—*Emphysema, with rupture of the pulmonary substance, in a patient long cured of pthisis.* A woman aged 52, had been affected for the last eighteen years with dyspnœa, habitual cough, attended with little expectoration, but often so rounded and prominently arched. The heart yielded both a slight impulse and sound. After a short stay in the hospital, the dropsical symptoms were removed, and he went out on the 9th of June. On the first of the following month, however, he returned, in the same state as when first admitted. At this time, I was led, from considering as well the symptoms present, as the absence of others, and from comparing the case with some which I had recently seen, to come to the conclusion that the disease was *general emphysema of both lungs*. The dropsical state was again relieved by diuretics, and he left the hospital on the 19th, affected merely with his habitual cough and dyspnœa. During the whole time he remained in the hospital, the stethoscope never detected the sound of respiration, except very feebly in a few varying points of the chest, particularly between the clavicle and third rib. This man returned once more to the hospital in September, with the pectoral symptoms as before, and with the addition of severe diarrhœa. He was getting better of this, when he was seized with small-pox, and died about three weeks after his admission into the hospital.

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CASE VIII.—*Emphysema, with rupture of the pulmonary substance, in a patient long cured of pthisis.* A woman aged 52, had been affected for the last eighteen years with dyspnœa, habitual cough, attended with little expectoration, but often so severe as to prevent sleep. She had never been prevented from following her occupation until the period of her entry into the hospital. At this time there was considerable emaciation, complete incapacity to lie in the horizontal posture, respiration short and difficult, very frequent and severe cough, of a convulsive character, like that of the hooping cough, with mucuos expectoration, pulse quick, and skin of the natural temperature. The chest sounded well on percussion, but respiration was inaudible in the greater part of it. Pectoriloquy was perfect above the right clavicle, and doubtful at the roots of both lungs. I caused the following diagnosis to be recorded: *Excavation in the top of the right lung, dilatation of the bronchi, particularly of the larger trunks.* It was to this last that I attributed the doubtful pectoriloquy towards the roots of the lungs. The state of the respiration, the comparison of the signs furnished by percussion and the stethoscope, and the whole symptoms taken together, indicated also emphysema of the lungs; but surprised at the great number of cases in which I had recently met with symptoms of this affection, I was unwilling to come to a decided opinion respecting its existence in the present case, without further examination,—and the more so, as the dilatation of the bronchi, which was supposed to exist, if found to be general over the lungs, might, by compressing the air cells, render the sound of respiration very indistinct. This woman died three days after her admission.

Dissection thirty-six hours after death. Both lungs were found adhering strongly to the ribs by old attachments. The upper lobe of the left lung was divided into two by a natural intersection, the superior division being entirely covered with semi-transparent vesicles, slightly prominent, and varying in size from that of a hemp-seed to a cherry-stone. These vesicles were evidently dilated air-cells, and covered more than two thirds of the supernumerary lobe. The cells between these were also dilated, but in a less degree, being about the size of a millet-seed. There were likewise two vesicles of the shape and size of peas, quite prominent on the surface, and with a sort of neck by which they were attached to the lung. Upon cutting into these, it was found that their cavity extended within the pulmonary substance about a line, and was there seen communicating with the adjoining cells. Over nearly all the rest of this lung, the dilatation of the cells was very conspicuous, though in a less degree than in the place just mentioned. Almost all of them were capable of containing a millet-seed, and a few of them would have received a hemp-seed or small pea. In different points on the surface of this lung, there were also four or five protuberances of an irregular oval form, and of the size of an almond, corresponding to excavations situated two or three lines deep in the lung, and which were produced by laceration of its substance. These cavities,—of which the largest might have contained a middling-sized walnut, and the smallest a filbert,—were full of air, and collapsed on being cut into. The internal surface of two of these were tinged with blood, and one of them contained a small clot of blood, one-fourth of its own size. The walls of the others were of the natural colour of the lung, and presented a layer of ruptured and compressed cells, to the depth of a line and a half. Beyond this depth, on all sides, the cells were distended beyond their natural size. It is to be remarked that the ruptured portions did not exist in any place at a greater depth under the surface than an inch, and that, below this, the emphysematous dilatation of the cells was not very distinguishable. It was equally evident that the cells in the vicinity of these lacerations were neither larger nor more numerous than elsewhere, and that there was no infiltration or extravasation of air into the inter-alveolar tissue. The right lung exhibited, but in a lesser degree, the same dilatation of the cells, but no rupture of substance. In the upper and posterior part of this lung, however, there was found an excavation of an oval shape, about two inches in length, fifteen lines broad in its centre, and two lines deep. The inner surface of this cavity was smooth and polished, though somewhat irregular; it was white, but interspersed with red specks arising from numerous small vessels. It contained some small fragments of an opaque, very dry, semi-friable matter, of a pale ochre-yellow colour, and attached to the walls of the cyst. Three bronchial tubes of the size of a goose-quill terminated with open mouths in this cavity. Their coats were continuous with its walls, and their communication with their trunks was quite free.

The cases, of which I have now given an account, exhibit vesicular emphysema of the lungs in its different degrees. The last case gives, further, an example of a cure of what is usually called an ulcer of the lungs, the true nature of which we shall see hereafter when treating of phthisis.*

SECT. II. *Interlobular emphysema.*

The pulmonary or vesicular emphysema, as we have just seen, is a disease essentially chronic; that which I am now going to describe, on the contrary, is, in most cases, a real traumatic lesion, almost suddenly produced. This is the emphysema admitted by surgeons; universally admitted, indeed, yet very little known according to its true anatomical characters. This is so much the case, that I do not know where any exact description of it, drawn from nature, is to be found

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* Vesicular emphysema of the lungs is a much more frequent disease than is commonly imagined. I meet with it constantly in practice, in some intermediate degree between what may be called its first stage, the dry catarrh, and its complete development in many cases of prolonged asthma. There is no disease which illustrates the importance and necessity of *percussion* more than this; as without its simultaneous employment, the stethoscope will, in many cases, lead to great errors of diagnosis. The outlines of two cases of this disease are given in my work entitled "Original Cases," &c. p. 271—3; and I could here add many more, but deem it unnecessary, as they tend to the same results precisely as are exhibited in the text.—*Transl.*

Anatomical characters. This affection is characterized by infiltration of air between the lobules of the lung. The texture of the cellular partitions which constitute the intersecting planes separating these lobules from each other, is so compact, that I doubted, a few years ago, the possibility of an infiltration of air within their substance;* but I have since that time met with several examples of the kind. The partitions in a state of emphysema, instead of the scarcely perceptible thinness natural to them, present a thickness varying from one line to six, or nearly an inch in some instances. And in place of their usual whiteness and opacity, they exhibit on the surface of the lung, and towards its edges principally, transparent bands, which formed a marked contrast with the opaque pulmonary substance. These bands are very exactly circumscribed, and upon examination are found to intersect the lung through its whole thickness, or at least to penetrate deeply into its substance. The want of colour and transparency of these bands is owing to the very thin and half-dried condition of the cellular tissue within which the air is extravasated. The emphysematous partitions are usually wider on the surface of the lungs, and gradually get thinner as they approach the centre; and, in this respect, they may be compared to the segments of an orange, which we may imagine to contain air instead of the pulpy juice of the fruit. Sometimes several bands run parallel to each other, containing perfectly sound portions between them. More rarely, the infiltrated band runs transversely, and thus by intersecting several of the vertical bands, one or more of the pulmonary lobules become completely insulated. Pretty often we observe along the course of the vessels, particularly those on the surface, bubbles of air extravasated into the surrounding cellular substance, somewhat like a string of beads; and in this variety, much more frequently and plentifully than in the vesicular emphysema, we find bubbles of air beneath the pleura. When the extravasation exists near the roots of the lungs, it speedily extends to the mediastinum, and from thence crosses to the neck and over the whole subcutaneous and intermuscular cellular substance of the body.

Although we must consider this affection as necessarily depending on a rupture of some of the air-cells in the first place, and the consequent extravasation of the air contained in them, into the cellular substance surrounding the lobules, yet we are unable to detect any actual rupture of the cells, and, indeed, can rarely observe any dilatation of these. Even the cells of those lobules which are entirely isolated by the extravasation, are in a perfectly sound state.

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* First Edition, tom. ii. page 213.

To have a correct conception of the anatomical characters of the interlobular emphysema, we must inflate the lung, pass a ligature above the affected part, and then dry it in the open air. If we then cut the preparation by slices, we observe the interlobular cellular substance, consisting of a set of very fine plates, perfectly trasparent, and crossing each other in all directions, so as to leave a series of intervening cells of unequal shape and size and all communicating with each other. I have already observed that the cells of the insulated lobules are in a sound state; and it is further remarkable, that if there happens to be an accumulation of blood in the part, from mechanical subsidence after death, the lobules are alone charged with it, the intersecting emphysematous bands being quite free from it.

I do not affirm positively that the emphysematous affection of the cellular partitions never extends to the lobules themselves; on the contrary, it seems probable in the case of very large infiltrations, that some intermediate lobules may have been obliterated; I must say, however, that I never could perceive any thing of the kind, in my researches.

Occasional causes. The most common of these is the prolonged forcible retention of the breath during powerful and long-continued exertions, as in child-bed, in relieving the bowels when constipated, and particularly in raising heavy weights. Children are more subject to this disease than adults. In them it occurs frequently during an attack of croup, or in severe catarrhs in which the bronchial obstruction is very great. In these cases we cannot attribute the accident to the act of crying, since this takes place chiefly during expiration; but rather to the violent inspirations which they take immediately before crying, or during fits of anger, or in struggling, so common in this stage of life. It occurs also, but much seldomer, in adults, during the existence of the before-mentioned diseases. Of these the most efficient in its production is the acute suffocative catarrh, particularly if of some days' duration, and when complicated with a slight peripneumony. Perhaps also we ought to range among the causes of this affection a spontaneous exhalation or secretion of air; as we find a similar secretion to take place in the cellular substance of other organs.

It may appear surprising that the interlobular emphysema does not almost always supervene to the vesicular, particularly after attacks of asthma, the consequence of the renewal of the dry catarrh in an acute form. Nevertheless, although I have myself seen several cases of the vesicular species since the publication of my first edition, and although I have received from my pupils many preparations of the same lesion collected from the different hospitals in Paris, I have never observed the two species combined, nor any further extravasation of air than into the cellular substance connecting the pleura with the lungs. This is no doubt owing to the air cells having become thickened during the continuance of the other species, which is a chronic disease. Besides, Reisseissen has remarked that the cellular tissue between the lobules is extremely dense, and cannot be penetrated, but with great difficulty, by the process of insufflation.

Signs. There is one sign completely pathognomonic of this affection, viz. *the dry crepitous rhonchus with large bubbles,* when very distinct and continuous, or nearly so. I am not aware that this sign is ever wanting in this case, and it is always more marked than in the vesicular emphysema. Together with this sign we usually perceive also, during inspiration and expiration, a sound or sensation as of one or more bodies rising, and falling, and rubbing against the ribs. These phenomena present considerable varieties. They are commonly re-united, but occasionally they exist singly, or they alternate. *The friction of ascent* takes place during inspiration; the dry crepitous rhonchus usually does the same, and often masks the former completely. *The friction of descent* accompanies expiration, and is much more frequently to be perceived than the other kind: it sometimes takes place as one sound; at other times it occurs in two or three successive sounds; very frequently it is only perceived immediately after expiration, and then conveys the impression as if something were descending into its proper place. Most commonly the friction seems to take place against the costal pleura; at other times it appears to have its site on the diaphragm, or mediastinum, or between the lobes of the lungs. These phenomena are sometimes accompanied by a crepitation perceptible by the hand. This sign is, however, frequently wanting, and usually disappears before the others; but sometimes, though rarely, it is more perceptible, at least at intervals, than they are. The dry crepitous rhonchus with large bubbles, and the friction of ascent and descent, are less liable to temporary interruption from obstruction of the bronchial tubes, than most of the other stethoscopic signs; such interruption, however, sometimesdoes take place, and may even last several days in cases where the lesion is confined to a small space. In some cases we can produce the crepitation by pressing the intercostal spaces over the affected part. The chest sounds well on percussion over the site of the emphysema, unless there happens to co-exist a gorged state of the lungs from peripneumony or other cause. Should an external emphysema make its appearance at the same time, beginning in the neck, the diagnosis of course is rendered more certain. In respect of symptoms of a general or local kind indicative of this disease, I believe that a dyspnœa coming on suddenly after a violent exertion, or continuing in a marked degree after croup, suffocative catarrh, or any other disease which may have given rise to temporary obstruction of the bronchi, is the only one from which its existence can be suspected. To this it may be added, that the patients are sometimes sensible of a kind of crackling in the part affected.

Treatment. Interlobular emphysema is usually an affection of less severity than we might be led to expect. When the aerial infiltration extends to the external parts, a few pricks with the lancet at the lower part of the neck, or wherever the emphysema is greatest, usually suffice to dissipate it. When it is confined to the lungs, the air appears to be always absorbed, and the interlobular partitions gradually return to their natural state. I never met with a fatal result from this disease alone; and I have seen several recoveries from it, in cases where its existence, even to a great extent, was most satisfactorily established. I will here notice two cases of the kind.

1. A young woman, convalescent from a severe acute catarrh, in the winter of 1823-4, presented the most evident signs of this disease, on the right side over a space larger than the hand. The dry crepitous rhonchus with large bubbles, and the friction of ascent during inspiration and of descent during expiration, were heard strongly and distinctly. A sense of crepitation was also felt by the hand during the stronger inspirations: sometimes, however, this was altogether wanting, and at other times it could be excited by pressure in the intercostal spaces. The dyspnœa, which was considerable when I first saw the patient, gradually diminished, and the phenomena above mentioned gradually decreased with it. At the end of two months the young woman left the hospital. I saw her in the ensuing spring, and found her quite well and without any symptom of emphysema.

2. A man aged twenty came into the clinical wards the 9th of May, 1825, affected with a very severe catarrh of three weeks' duration. At this time he had all the symptoms of the acute suffocative catarrh, extreme dyspnœa, tracheal rhonchus, high fever. The chest, on percussion, sounded pretty well throughout, but perhaps somewhat imperfectly on the left back; the sound of respiration was feeble or moderate every where; mucous, sonorous, and sibilous rhonchi, singly or conjoined, existed in different points; and a slight crepitous rhonchus with bronchial respiration was perceived at the roots of the left lung. The mucous rhonchus was felt by the hand in several places, particularly on the sides. There was also a sub-crepitous rhonchus at the root of the right lung. These latter signs being indicative of an incipient double peripneumony, although there was as yet hardly any expectoration, I ordered eight ounces of blood to be taken from the arm, and prescribed emetic tartar in large doses.

(See the chapter on *Pneumonia.*) This was borne moderately well, and produced considerable action on the bowels, without vomiting. On the 12th, the expectoration was glutinous and tinged with blood, and there was severe pain of the right side, in consequence of which cupping glasses were applied. But the tracheal rhonchus and dyspnœa were somewhat diminished, and it was further discovered by the stethoscope that the peripneumony had not advanced in these points where the crepitous rhonchus had been found, while it had retrograded in those where the bronchial respiration had been perceptible,—this mark of hepatization being now superseded by a crepitous rhonchus. On the 14th, the tracheal rhonchus being less, and the strength improved, I added some syrup of poppy to the antimonial mixture, and allowed the patient more soup. After this time, the fever, diarrhœa, and dyspnœa did not return; the respiration began to be pretty distinct over the whole chest, and although it was accompanied by different kinds of rhonchi, the crepitous was not among them. On the 17th, the patient was quite convalescent. On the 20th, on examining the chest more closely, I discovered the *friction of ascent and descent* on both sides of the chest, and also the *dry crepitous rhonchus with large bubbles* —the former most marked on the left, the latter on the right side. I made, in consequence, the following addition to the diagnostic ticket—*Emphysema interlobulare partium inferiorum utriusque pulmonis.* This patient left the hospital on the 29th, the signs of the emphysema, although daily decreasing, being still very well marked.* At the end of three weeks he called upon me, when I found him quite well, and without any of the stethoscopic signs above mentioned.†

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* I doubt if these two cases can be regarded as instances of interlobular emphysema; being disposed rather to regard them as examples of slight pleurisy grafted upon catarrh, or a peripneumony unaccompanied by effusion, and therefore unmarked by ægophony. As was remarked in a former note, *the sound of friction* is equally perceptible in pleurisy as in interlobular emphysema, indicating in either case, according to M. Reynaud, an unequal or roughened condition of the pleura. Perhaps it is even exclusively confined to the former of these affections as the dry crepitous rhonchus seems to be to the second; the reunion of the two signs indicating the complication of the two diseases. This is, at least, the inference which I draw from my own observations while officiating in M. Laennec's clinic as in almost every case where *the sound of friction* is noted, the card of the diagnosis bears the inscription of "*pleurisy and interlobular emphysema.*" The same conclusion is deducible, still more certainly, from the third case of M. Reynaud, as both the sounds were perceptible during life, and the two lesions were discovered after death. (See *Journ. Hebd.* No. 65, p. 576.)—(*M. L.*)

† This disease has been only hitherto known to English practitioners when manifested by the extension of the emphysema to the external subcutaneous cellular substance. Various cases of this kind occurring during labour and from severe coughing, are recorded in our miscellaneous collections. I shall here refer to some of the most remarkable of these which took place during labour. Med. Comment. vol. i. p. 176; Med. Facts, vol. ii. p. 45; Halliday on Emphysema, p. 46; Ed. Journ. vol. vii. p. 174; Cyclopæd. of Pract. Med. vol. ii. p. 16; Dub. Trans. vol. [illegible] p. 112; Louis, Mém. de l'Acad. de Chir. t. iv.; Dict. des Sc. Med. t. xii. p. 7. [illegible]

CHAPTER IV

OF ŒDEMA OF THE LUNGS.

Œdema of the lungs is the infiltration of serum into the substance of this organ, in such degree as evidently to diminish its permeability to the air, in respiration. Although very common, this disease is very little known. None of the authors who have treated formally of dropsy, have mentioned it, and the expression *dropsy of the lungs*, which occasionally occurs in their writings, is generally applied to cases of hydrothorax, or to the supposed existence of cysts of serous fluids in the lungs, the rupture of which was considered as giving rise to hydrothorax.* Among practical writers, Albertini† and Barrere‡ are the only ones who have paid any attention to this disease, and who have given any cases of it. The observations of the latter, particularly, prove that he was well acquainted with the affection, although he, perhaps, attached too much importance to it, and did not distinguish sufficiently between it and the first stage of peripneumony.

Œdema of the lungs is rarely a primary and idiopathic disease. It comes on, most commonly, with other dropsical affections, in cachectic subjects, towards the fatal termination of long-continued fevers, or organic affections, especially those of the heart. Peripneumony that has terminated by resolution, appears also to leave a great predisposition to it; and the most extensive and severe cases that I have met with, occurred during a temporary convalescence from severe attacks of this disease. Acute and chronic catarrhs, likewise, predispose to it; and in such cases it often proves fatal by inducing suffocation. Although this disease is commonly a mere consequence of other affections, and often takes place only a few hours before death, neverthe-

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literature of emphysema of the lungs is very limited: the following are the principal works in which it is either formally or incidentally noticed :—

1807. Halliday (And., M.D.) Obs. on Emphysema. *Lond.* 8vo.
1815. Breschet. Dict des Sc. Méd. (Art. *Emphyseme,*) t. xii.
1820. Cloquet (Jul.) De l'Influence des efforts sur les organes renfermés dans la cavité thoracique. *Paris.* 8vo.
1823. Murat. Dict. de Méd. (Art. *Emphyseme,*) t. vii.
1829. Piedagnel. Recherches sur l'Emphyseme du Poumon. *Paris*, 8vo.
1831. Bouillaud. Dict. de Méd. et de Chir. Pr. (Art. *Emphyseme,*) t. vii.
1833. Townsend. Cyc. of Pract. Méd. (Art. *Emphysema* and *Emphysema of the Lungs.*) vol. ii. *Transl.*

* Hippoc. de Intern. Affect.—Carol. Piso, de Morb. a serosa Colluvie.—De Haen, Ratio Méd. tom. ii. pars v. cap. iii. De Hydrope Pectoris.

† Comment. de Bonon. sc. inst. tom. i.

‡ Observat. Anatom.—*Perpignan*, 1753.

less, in some cases, it had certainly lasted several weeks, and even months; and, in a few of these, it seems to have been idiopathic. The suffocative orthopnœa, which sometimes carries off children after attacks of measles, is probably idiopathic anasarca of the lungs. I have not hitherto been able to verify this conjecture by dissection; but when we consider the dropsical tendency of such cases, and the frequent complication of measles with peripneumony, it would seem to be well founded.

Anatomical characters. When œdema occupies the whole of one lung, and has been of some duration, the pulmonary tissue loses entirely the slight rose tint which is natural to it, and becomes of a pale grey colour; it is denser and heavier than in its sound state, and does not collapse on opening the chest. It is, however, still nearly as crepitous as before. It retains the impression of the finger more tenaciously than a sound lung. Its vessels seem to contain less blood than usual, and, when cut into, there flows from it an abundance of serum, which is either colourless or very slightly tawny, transparent, and just perceptibly spumous. The characters last mentioned would suffice to distinguish this disease from the first degree of peripneumony (in which the serum effused into the inflamed lung is strongly tinged with blood, and very frothy,) even if the characteristic redness of inflammation did not establish a very marked distinction between the two diseases. However, it is by no means uncommon to find, in anasarcous lungs, some spots inflamed (as in peripneumony) in the first, and even second degree,—the inflammatory affection gradually shading into the merely œdematous condition of the surrounding parts. Facts of this kind point to the great affinity (which will be noticed more particularly hereafter) between inflammation and the dropsical diathesis. When the disease is of recent occurrence, the serum is very frothy. That variety of it which occurs immediately before death, is usually partial, and occupies the posterior and inferior parts of the lungs, like the mechanical infiltration which occurs after death, and with which it may be considered as almost identical. Whatever may be the intensity of the œdema, it produces no change in the integrity of the alveolar structure of the organ. This fact is not, however, quite obvious until we cut into the diseased lung, owing to the fluid contained in the cellular tissue. When œdema of the lungs has been of long standing and universal, we do not commonly perceive the sanguineous congestion of the posterior parts of the lungs, as in ordinary cases. We must not confound with the true pulmonary anasarca a species of infiltration which often takes place in phthisis, in the intervals of the tuberculous masses, and which I shall notice in its place.

Symptoms and signs. The symptoms of this affection are extremely equivocal. Impeded respiration, slight cough with

of a watery expectoration, are the only signs by which we can be led to suspect its existence. In some cases there is scarcely any perceptible expectoration: in others it is copious, colourless, frothy, and of a consistence and appearance resembling white of egg dissolved in equal parts of water. Like the expectoration of peripneumony, it adheres to the bottom of the vessel containing it, when this is reversed, but it is much more liquid and less tenacious. In cases where the œdema is complicated with partial spots of pulmonic inflammation, amid the mass of expectoration just described there are found some sputa of a tawny, greenish or light rusty colour, but still transparent. This sort of expectoration resembles that of the pituitous catarrh.

Percussion hardly affords any useful results in œdema of the lungs. Both lungs are either equally affected at the same time, or if one is more so than the other, there appears to be still a sufficient quantity of air retained in it to prevent its yielding the dull sound. The stethoscope furnishes two means of diagnosis in this case. The respiration is much feebler than might be expected, from the great dilatation of the thorax; and there is, at the same time, a slight crepitation, as in the first degree of peripneumony, more like a rhonchus than the natural sound of respiration. This crepitous, or rather subcrepitous rhonchus, is more humid than in peripneumony, and the *bubbles* appear larger. It must be admitted, however, that it is sometimes difficult to distinguish these two diseases by the stethoscope alone, without taking into account the general symptoms. When the œdema is very general and in a high degree, the natural sonorousness of the chest is very perceptibly lessened; and in these cases there is slight bronchophony, particularly at the roots of the lungs. But we can almost always distinguish the œdema from the incipient peripneumony, by the long continuance of the crepitous rhonchus, and the absence of the general symptoms of inflammation in the former disease.

There is another case in which the signs of œdema are extremely obscure or altogether wanting, that, namely, where it supervenes to emphysema or the severer dry catarrh. If we have previously ascertained the existence of the catarrh or emphysema, we shall scarcely be aware of the addition of the œdema, the respiration being too feeble to permit the development of the crepitous rhonchus; and if the case is first presented to us in its state of complication, the nearly total absence of the respiratory sound, the sonorousness of the chest, and the slight sibilous rhonchus, will only point out to us the emphysema.*

Should the patient die, the examination of the body is likely to lead us into an error on the other side: we shall at first perceive only the œdema; and, indeed, if this is considerable, some attention will be necessary to enable us to find any signs of the emphysema. The air-cells when charged with serum lose their transparency, the lungs do not collapse, nor are the dilated cells more prominent than the others. It is here to be observed, however, that it is very rare for the whole lungs to be so very œdematous, as not to leave some points, particularly at the anterior edge and ends of the lobes, in a state to exhibit the emphysema. When there is any doubt as to state of the parts, we must inflate the suspected portions, include them within a ligature and then dry them; the dilated cells will become more apparent as the surface loses its humidity. The same remarks apply still more forcibly to peripneumony, as masking, in the dead body, the characters of emphysema. In the case of this complication, moreover, it will be often a matter of difficulty to recognize the peripneumony in the living subject, if the disease is not so far advanced as to produce a dull sound on percussion, which will only be the case in the second and third stages of the inflammation. If, indeed, we have ascertained the existence of the emphysema previously, percussion will enable us to detect the peripneumonic affection, as the sound will become entirely dull as soon as the disease has made considerable progress.

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* In this case, the best method to produce the crepitous rhonchus is to make the patient cough or hold his breath for a considerable time.—*Author.*

I have thought it necessary to enter into these details, on account of the occasional difficulty of recognizing these diseases, both in the living and dead subject, when they are combined; and because an inattentive observer, after being mistaken in cases of this kind, might be led to conclude that the signs of inflammation, emphysema, and œdema of the lungs, laid down in this work, are neither certain nor constant. The following case affords an example of the facility with which such a mistake might be made by a practitioner ignorant of the characters of emphysema, both in the living and dead body.

CASE IX. A man, sixty years of age, came into the Necker Hospital, with every symptom of the most marked emphysema. The chest sounded well, and the respiration was perceptible only in a very slight degree and at intervals, in different points, which were variable: it was also attended by a slight rhonchus like the clicking of a valve. Having ascertained the nature of the disease, and the patient being in a hopeless state, I did not again percuss the chest; but I ascertained by the stethoscope that respiration was entirely wanting in the upper part of the right side, during the three last days of his life. Upon examining the body, the superior lobes of the right lung were found inflamed, being very red, nearly as hard as liver, and without any trace of the air cells: the rest of this lung was loaded with serum, which was slightly bloody in some points, and quite colourless in others. The left lung was not at all inflamed, but was also loaded with serum, although in a less degree than the other. The serum was also more frothy, and more generally colourless. At first sight neither of the lungs seemed to be emphysematous, except that there was, on the surface of the upper left lobe, one air-cell enormously dilated, very like a grape-stone. Upon cutting into this, there was found a cavity within the pulmonary substance capable of containing a filbert, and whose walls were formed by air-cells which seemed to open into it. Upon examining attentively the surface of both lungs, a great number of cells, here and there, were found dilated sufficiently to contain a millet or hemp-seed, although their dilatation did not strike the eye at first, on account of the loss of transparency from the œdema. There were also three or four protuberances, corresponding to ruptures of the pulmonary tissue, like those described in the preceding chapter.

This patient exhibited the signs of pulmonary emphysema in so striking a degree, that it could not have been mistaken even by the least informed student, after reading the account I have given of this affection: and yet it is almost certain that, upon examining the body after death, such a person would have recognized no other mark of it besides the greatly dilated and prominent cell above mentioned, and would, therefore, have concluded either that he was mistaken in his diagnosis, or that the signs of emphysema are uncertain.

I shall now detail three more cases of œdema of the lungs—the first exhibiting the disease in a state of simplicity; the second being an example of the complication just noticed; and the third an instance of this affection supervening to a severe peripneumony, and before the resolution of the inflammation had been fully established.

Case X.—*Œdema of the lungs, with ascites and anasarca.* A woman, aged forty-seven, subject to irregular menstruation for a twelvemonth, was suddenly seized with a severe pain in the left side, attended by dyspnœa and cough. She came into the hospital a fortnight hereafter, affected with œdema of the superior extremities, particularly the left—dyspnœa and cough, (not very frequent,) with expectoration of white viscid sputa, intermixed with much saliva. These symptoms got better during the first month; but during the second, the anasarca greatly increased, and extended over the whole body, except the face. She had sometimes pain in the chest, and sometimes in the abdomen. The pulsation of the heart was irregular, and the pulse very indistinct. The patient took little sleep, coughed a little, and expectorated blackish sputa. During all this time the respiration was pretty distinctly audible throughout the chest, but accompanied by a slight crepitous rhonchus. At this time the diagnosis was given—*œdema of the lungs with general serous diathesis.* A fortnight after this, and a month before her death, it was found, on applying the stethoscope, that the respiration was very distinct on both sides anteriorly, and was accompanied by a slight crepitous rhonchus on the lower parts of the sides and back. She died about three months after her admission.

Dissection thirty hours after death.—The cavities of the pleura contained somewhat less than a pint of a limpid serum; the lungs adhered nearly through their whole extent by long cellular attachments, and their substance was throughout little crepitous, and injected by a frothy and nearly colourless serum, which gave the lungs a sort of semi-transparency, and flowed copiously from them when cut into. In other respects the pulmonary tissue was sound, of a pale rose-colour, free from tubercles, and exhibiting no trace of peripneumony, nor even of sanguineous congestion. There was found water in the cavities of the pericardium and peritoneum.

Case XI.—*Œdema supervening to emphysema of the lungs.* A woman, aged forty-five, who had been affected (according to her own account) with *asthma* and habitual cough, attended by a slight expectoration, ever since she was nine years old, came into the Necker Hospital in March 1819, on account of an aggravation of her dyspnœa and a local pain of the leg. At this time the respiration was short, difficult, and interrupted by fits of coughing, followed by yellow mucous expectoration; the skin was rather cold, the action of the heart regular, and the pulse a little frequent. The sound of respiration was very indistinct over the whole chest, and was, now and then, accompanied by a slight rhonchus, which was at one time sibilous, and at another like the clicking of a valve. The chest sounded somewhat imperfectly on the left back. From these indications the diagnosis was given—*Chronic catarrh—Emphysema of the lungs.* During the succeeding month the œdema of the lower extremities, which was very slight on her entrance, increased; and she had comatose symptoms, which seemed to threaten apoplexy. These continued more or less; the anasarca became general, and, together with a severe attack of diarrhœa, exhausted the patient, who died about six weeks after her entry.

Dissection twenty-four hours after death.—There was a good deal of water in the head. The right lung exactly filled the cavity of the chest, and remained uncollapsed; it adhered throughout to the pleura by well-organized cellular laminæ, which were in some places infiltrated with a yellowish serosity. On the anterior surface of the lung several of the air-cells were dilated to the size of a hemp-seed. The lung seemed pretty firm; on compression it was found to retain the impression of the finger, and, when cut into, allowed a large quantity of a clear and slightly frothy serum to escape. In the upper part of it there were, here and there, some points of small extent, which were somewhat red, compact, and not alveolar, and which exhibited a granulated surface when incised. The remainder of the viscus had the natural aspect, and was still sufficiently crepitous, but heavy; it did not yield, like the sound organ, to pressure, being injected throughout with a large quantity of an almost colourless serum, which could be squeezed from it like water from a sponge. The left lung adhered, in like manner, to the pleura, and, with the exception of the peripneumonic appearances, exhibited the same morbid condition as the right. There was, further, on the superior part, a patch of fibro-cartilaginous membrane, two or three lines thick, which, in this place, formed the medium of adhesion between the lungs and pleura of the ribs, to both of which it was intimately united. In the interior of this lobe there was a vast tuberculous excavation, capable of containing a middle-sized apple, (reinette,) and which contained merely a small quantity of a very limpid mucosity. It was lined throughout with a polished diaphanous membrane, of a consistence between that of the mucous membrane and cartilage. This cavity was traversed, in different directions, by very white, small, rounded columns, which proved, on close examination, to be obliterated blood-vessels, and which, although continuous with the lining membrane of the excavation, were sufficiently distinguished from it by their shining whiteness and opacity. The trunks of these obliterated vessels terminated in culs-de-sac, either a few lines within or without the excavation. In the obliterated portions the original cavity of the vessel was still distinguishable by a longitudinal band of greater transparency. Five or six bronchial tubes opened into this cavity, in the manner which will be described in the chapter on phthisis.* The pulmonary tissue in the inferior part of this excavation was crepitous, though injected with serum; in every other part of the boundaries of the cavity, it formed a layer, two or three lines in thickness, which was flaccid, and of a very deep black colour, owing to the accumulation of black pulmonary matter. There were no tubercles in either lung. There was some water in the pericardium and peritoneum.

Case XII.—*Œdema of the lungs supervening during convalescence from peripneumony.* A woman, aged forty, had been always from her childhood of delicate health, and habitually subject to great difficulty of breathing and palpitation of the heart. This state was aggravated, in her twenty-seventh year, by the supervention of general dropsy, of which, however, she was cured by diuretics: from this time her health continued still to decline. In the beginning of January 1817, after having sat up with a sick person for several nights, her respiration became extremely difficult, especially on motion; she lost her sleep and appetite, and she had a slight cough, with mucous expectoration. In this state she came into the Necker Hospital on the 7th of March following, with œdema of the lower lungs, livid lips, extreme oppression, frequent palpitation, and startings during sleep. At this time the chest on percussion yielded an imperfect sound on the left side before, and the right side behind, and no sound at all in the region of the heart; and in all these points the stethoscope detected no respiratory murmur. The heart yielded a distinct sound, but scarcely any impulse, when explored by the stethoscope. From these premises the diagnosis was given—*Partial peripneumony of both lungs—dilatation of the heart without hypertrophy.* She died on the 2nd of June.

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* From the patient's history it would seem that this vast pulmonary fistula had existed ever since her ninth year. The case is further remarkable from the circumstance of the excavation being traversed by blood-vessels.—*Author.*

Dissection twenty-four hours after death. The brain was natural, but with a small quantity of serum in the ventricles. There was about half a pint of serum in each side of the chest, and some cellular adhesions on the right. The upper part of the right lung was sound, only injected with a colourless serum. The middle and inferior lobes were more compact, and discharged, when cut into, a great quantity of transparent colourless serum, intermixed with a thicker, yellowish, puriform fluid. These lobes were, nevertheless, crepitous, with the exception of a few spots, of small extent, here and there, which had a density almost equal to that of liver, a yellow and somewhat reddish colour, and a granulated surface on incision. The left lung was in the same state, only without the more solid portions. Both lungs had a yellowish grey colour, like that of this viscus when infiltration with pus after an attack of peripneumony, only paler. Indeed, it appeared evident that, in this case, a peripneumony of the inferior portion of both lungs had ended in suppuration, and that the greater part of the pus had been absorbed, the final restoration of the part failing through the debility of the system. The pericardium contained two ounces of serum. The heart was large, its substance soft and easily torn, and its cavities very voluminous.*

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* This chapter is purely anatomical; and it is probable that all notice of treatment was purposely omitted by the author. Œdema of the lungs is in fact so generally symptomatic, that its treatment must merge in that of the accompanying affection. I will, however, subjoin some directions on this point, extracted from M. Laennec's notes for his course of Lectures on Medicine at the *College de France.* When the œdema of the lungs is *active* or *subperipneumonic*, we must treat it as we do pneumonia, with the exception of bloodletting, which is contra-indicated by the serous diathesis. Tartar emetic in large doses, and its substitutes the white oxyd of antimony and kermes mineral, may however be very useful. (Vide the Chapter on *Pneumonia.*) When, on the other hand, the œdema has passed to the chronic stage, or when it has put on the *passive* character from the commencement, we must have recourse to the ordinary remedies for dropsy, viz. purgatives and diuretics, and, according to the case, tonics and steel. The preparations of squill, nitre in large doses, and the acetate of potass, are the diuretics most commonly employed. The latter medicine in particular is very valuable, if given in a sufficiently large dose (from half an ounce to an ounce in each pint of tisane,) as it then operates both as diuretic and purgative. When the œdema is conjoined with disease of the heart, the treatment merges entirely in that of the latter affection, only that the great danger

CHAPTER V

OF PULMONARY APOPLEXY.

THE disease which I designate by the name of Pulmonary Apoplexy, though very frequent, is yet very little known in respect of its anatomical characters. It is, however, well known by its principal symptom, viz. hæmoptysis, or hæmorrhage from the lungs, usually severe and abundant. We have already shown that the slighter cases of hæmoptysis depend upon a simple exhalation from the mucous membrane of the bronchi. Those cases, however, of violent and extreme hæmorrhage, which often resist all medical treatment, arise from a very different and more dangerous cause.

Anatomical characters. This alteration consists in an induration of the lung equal to the completest hepatization. The induration, however, is very different from the inflammatory affection of the lungs distinguished by that term. It is always partial, and scarcely ever occupies a considerable portion of the lungs; its more ordinary extent being from one to four cubic inches. It is almost always very exactly circumscribed, the induration being as considerable at the very point of termination as in the centre. The pulmonary tissue around is quite sound and crepitous, and has no appearance whatever of that progressive induration found in the peripneumonic affection. The substance of the lung is, indeed, often very pale around the hæmoptysical induration; sometimes, however, it is rose-coloured, or even red, as if tinged with fresh blood; but, even in this case, the circumscription of the indurated part is equally distinct. The indurated portion is of a very dark red, exactly like that of a clot of venous blood. When cut into, the surface of the incisions is granulated as in a hepatized lung; but in their other characters, these two kinds of pulmonic induration are entirely

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the complication renders the use of purgatives more applicable than ever, that is to say, in as far as the strength will permit their administration. Blisters are rarely beneficial in œdema of the lungs; and they are particularly contra-indicated in the case of complication with disease of the heart.—(*M. L.*)

Œdema of the lungs is noticed by many English authors. Dr. Baillie, however, says he has not seen any well-marked example of it. Morb. Anat. page 77. Dr. Parry considers it (Elements, page 106) as a frequent, and indeed necessary, consequence of peripneumony; and in this he seems corroborated by the experience of our author. Dr. Darwin notices it among other dropsies, under the title *Anasarca Pulmonum*. See Zoonom. vol. iii. p. 172, London, 1801. See also Dr. Percival's Essays Med. and Exper. vol. ii. p. 173, et seq. This author recommends, after the failure of other means, *paracentesis of the lungs*, (p. 179, 180,) with as much earnestness and reason as Floyer recommends the same operation for the cure of emphysema of the lungs!—*Transl.*

different. In the second degree of hepatization, along with the red colour of the inflamed pulmonary tissue we can perceive distinctly the dark pulmonary spots, the blood-vessels, and the fine cellular intersections; all of which, together, give to this morbid state the aspect of certain kinds of granite. In the induration of hæmoptysis, on the contrary, the diseased part appears quite homogeneous, being altogether black, or of a very deep brown, and disclosing nothing of the natural texture of the part, except the bronchial tubes and the larger blood-vessels. The latter have even lost their natural colour, and are stained with blood. The veins of the affected part, and also those adjoining, are sometimes filled with a firmly coagulated and half-dry blood, a kind of *infarctus* which will be noticed afterwards when we come to treat of the diseases of the pulmonary vessels. In scraping the incised surfaces of these parts, we can detach a small portion of very dark, half-congealed blood, but in a much less proportion than we can press out the bloody serum from a hepatized lung. The granulations on the incised surfaces have also appeared to me larger than in cases of hepatization. Sometimes the centre of these indurated masses is soft, and filled with a clot of pure blood.

This lesion is evidently produced by an effusion of blood into the parenchyma of the lungs, in other words, into the air cells. From its exact resemblance to the effusion that takes place in the brain in apoplexy, I have thought the name *Pulmonary apoplexy* very applicable to it, as it resembles in every respect the cerebral hæmorrhage commonly termed apoplexy.*

The lungs and brain are not the only organs in which a similar effusion may take place. I have seen such happen instantaneously in the subcutaneous cellular substance, and I have met with them, during dissection, in almost every part of the body,—between the intestinal tunics, among the muscular fibres of the heart, and under the cellular coverings of the pancreas and kidneys. In a case of fatal apoplexy I have found large effusions of blood in the cellular membrane of every limb, of the trunk, and in that surrounding most of the abdominal viscera. Some examples have occurred of sudden death from hæmoptysis, wherein the substance of the lungs was found lacerated, and containing clots of blood. Corvisart mentions one extraordinary case of this kind, in which the extravasion had lacerated the lung and filled the cavity of the pleura.[*] The hæmoptysical engorgement above described, is only a lesser degree of the same affection, in which the effused blood (still in some degree under the influence of vital action) coagulates in the air cells, in such a manner as to form an intimate union with the pulmonary tissue, very different from what would be produced by the mere physical coagulation of the blood. We sometimes find two or three similar indurations in the same lung, and frequently both lungs are affected at the same time. They take place most commonly in the central parts of the lower lobe, or towards the middle and posterior part of the lungs: it is consequently on the back and inferior part of the chest that we ought to search for them with the stethoscope.

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* The perfect analogy between pulmonary and cerebral apoplexy has been completely established in a very admirable thesis by M. Rousset, (*Recherches sur les Hemorrhagies*, Paris, 1827,) and in the recent treatise on apoplexy, by Professor Creveilhier (Dict. de Méd. Prat. t. iii. p. 278.) We may observe in the lungs, as in the brain, and indeed in most of the other organs, the three forms of hæmorrhage, viz.—1. *The blood-stroke, (coup-de-sang,)* an instantaneous and universal congestion without any escape of blood from the vessels; of this form the lungs offer an example in the case of asphyxia, in which the pulmonary tissue, without losing its wonted crepitation on being handled, is coloured of a dark red hue, and pours out, when incised, a profusion of fluid black blood: 2. *Apoplexy*, properly so called, such as is described in the text, and varying from simple infiltration to the largest coagula of blood, with rupture of the vessels and laceration of the organ; 3. Slow hæmorrhagic infiltration or *splenisation*, in which the tissue of one whole lung or one lobe slowly and progressively penetrated by blood, assumes a darkish red colour, and becomes smooth, heavy, hæmogeneous, and friable as the spleen, with the organization of which it presents a resemblance more or less close. This last variety of pulmonary apoplexy is common in old persons who have been long confined to bed in one posture. It is also observed after diseases of an adynamic kind, whether acute or chronic. The *splenised* portions are sometimes softened partially or totally, being converted into a sort of blackish paste, which we might mistake for the effect of putrefaction. In some cases these portions are intermixed with spots of the inflammatory hepatization, recognized by their red or yellowish colour, and which contrast well with the dark ground of the general mass.—(*M. L.*)

This affection is as easily distinguishable from the congestions that take place after death, as from the alterations produced by peripneumony. The sanguineous congestions of the dead body consist of an accumulation of blood intermixed with serum, often spumous, which flows plentifully on an incision of the part, and tinges the lungs of a livid or vinous colour. Being the mere consequence of gravitation, the engorgement is found most considerable in the most depending parts of the lungs, and gradually lessens towards the superior parts. Where most engorged, the part still retains some crepitation, and the incised surfaces are never granulated, even when the congestion is so great as to destroy the spongy character of the lung. By washing, we can, in every case, remove all the red, and restore the lung to that sort of flaccidity which it possesses when compressed by a pleuritic effusion. The engorgement of hæmoptysis, on the contrary, is accurately circumscribed,[†] very dense, dark red or brown, granulated, and almost dry when incised, and grows pale by washing. but without losing any part of its consistence. Whatever may be the severity of this disease, resolution seems to take place with considerable facility, since we find a great many cases of recovery after severe hæmoptysis. I have not had many opportunities of tracing the progress of this resolution by dissection; but in the small number of cases of this kind which I have met with, it has appeared that the indurated parts passed successively from dark red to brown and pale red, and that, in proportion as the colour faded, the parts lost their granular texture and their density. I do not think that this obstruction is followed, at least constantly, by œdema, as is the case with the obstruction of peripneumony. When the resolution is complete, it leaves no trace of disease in the pulmonary substance, since I have never been able to find any vestige of the induration in subjects who had been affected with severe hæmorrhage at a period of some years—or only some months—anterior to their death.*

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[*] *Nouvelle Methode, &c.* par Avenbrugger traduit par Corvisart. p. 227. A few other cases of the same kind are on record. At present I recollect only the following: 1. The case of Professor Mahon noticed by Leroux, *Journ. de Med. Chir. et Pharm.* t. ix. p. 136. 2. A case by Hohnbaum, *Ueber den Schlagfluss*, Erlangen, 1817, p. 75. 3. A case by Bayle, *Revue Méd.* Avril, 1828, p. 61. 4. A case by Andral, *Clinique Méd.* t. iii. p. 167. 5. A case by Dr. Ferguson, *Dub. Med. Trans.* New Series. Vol. i. p. 11 —*Transl.*

[†] The slow hæmorrhage or *splenisation* is *not accurately circumscribed*; but it is sufficiently distinguished from the cadaveric engorgement by its other characters, and particularly by the blackish colour of that portion of the pulmonary tissue wherein it is seated.—(*M. L.*)

Signs and symptoms. The principal symptoms of this disease are the following:—great oppression, cough attended by much irritation of the larynx, and sometimes by very acute pain in the chest;—expectoration of bright and frothy or black and clotted blood, quite pure or merely intermixed with saliva, or some bronchial or guttural mucus; pulse frequent, full, and with a particular kind of vibration, even when soft and weak, as it frequently is after a day or two. There is rarely any positive fever, and the heat of the skin continues natural or nearly so. Frequently the heart and arteries yield the *bellows-sound* in a very marked degree, the character of which phenomenon will be given when we come to treat of diseases of the heart. Of all these symptoms the spitting of blood is the most constant and most severe. This is commonly very copious, returning by fits, with cough, oppression, anxiety, intense redness or extreme paleness of face, and coldness of the extremities. When the hæmorrhage is very great it comes on sometimes with a very moderate degree of cough, and is accompanied by a convulsive elevation of the diaphragm like that which takes place in vomiting. This accounts for the expression—*vomiting of blood*, which is used by most persons who have suffered a violent hæmoptysis. And I am of opinion that this expression is not always improperly applied in such cases. It is hard to believe that those immense and instantaneous discharges of blood, partly too in a state of coagulation, which burst at once from the mouth and nostrils, and fill a basin in a few moments, can proceed entirely from the bronchi. The very size of the coagula seems, in many cases, to render this impossible; while the accompanying action of vomiting would seem to confirm the co-existence of a hæmatemesis with the hæmoptysis. This conjecture I have sometimes proved to be correct, but not often; as it is not very common to find patients die during the very course of a severe hœmoptysis: while, on the other hand, I have sometimes found in the stomach only a very small quantity of blood, (and which appeared to have been swallowed), even in cases where the hæmorrhage had been accompanied by very decided efforts to vomit. The quantity of blood discharged is sometimes enormous. I have known ten pounds lost in forty-eight hours, by a young man, who died under the hæmorrhage. In cases of a less acute character, I have seen about thirty pounds lost in a period of fifteen days. Rhodius (Cent. II. obs. XXX.) relates similar instances. Hæmorrhage so severe as this almost always indicates the existence of a hæmoptysical induration. Yet this conclusion is not always correct; since we have already seen that very violent discharges may proceed from the bronchi alone; while, on the other hand, there may exist an extensive hæmoptysical infiltration, although the expectoration of blood is trifling, for instance, not more than from two to six ounces in the twenty-four hours. When the infiltration is only of moderate extent, as from one to two inches square, there may be no expectoration whatever of blood, and the disease may be latent. This was the case with the first examples of this disease that occurred to myself; and I was, in consequence, puzzled to what disease I should refer the morbid alteration, of which I had previously met with no account. Haller is the only author, who to my knowledge, has given, under the name of *peripneumony from exudation of blood*, a brief history of a disease which, from the account of the state of the lungs, I consider to have been a case of very extensive pulmonary apoplexy. It is probable that in this case there was no hæmoptysis worth noticing, since the author does not mention it, and describes the disease as a peripneumony.* (Opusc.Pathol. obs xvi. hist. i.)

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* Pulmonary apoplexy does not always terminate in resolution. The pulmonary extravasations may, as is remarked by Cruveilhier, (Op. Cit. Propos. 22), pass through the same stages as those in the brain. Thus, the pulmonary lobules affected with apoplexy, when the fluid part of the blood is absorbed, may be gradually transformed into indurated nodules of a jet dark colour, and which existing as so many foreign bodies in the lungs, become isolated by means of a cyst, in the same way as takes place in the case of cerebral effusions. Perhaps it may be in this way that the *encysted melanosis*, to be noticed in a subsequent part of this work, may be produced. In other cases, rare indeed, like the above, the affected parts of the lung become softened and resolved into pus. In cases of this kind we find in the lungs real cavities, the walls of which are either gorged with blood or exhibit the natural appearance of the pulmonary substance, according as the softening has been more or less complete: these cavities contain a thick fluid, of the colour of wine-lees, and consisting of a mixture of pus, blood and pulmonary detritus. It is probable that excavations of this sort may, like those arising from tubercles, become lined by a fine membrane, and undergo analagous transformations and even cicatrization. Although this last result has never been actually observed, the analogy is so strong as almost to stand in lieu of direct proof; it being infinitely probable, as is observed by M. Rousset, that the pulmonary cicatrices—so frequent that out of twenty dead bodies four at least will be found to exhibit them—have, in a considerable portion of cases been the consequence of an apoplectic extravasation and not of phthisis, which is not likely to be so frequently of a purely local character.—(*M. L.*)

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* The affection described in the preceding pages was entirely unknown as a common cause of hæmoptysis before the publication of the first edition of our author's treatise; although some varieties of it had been noticed by former writers, and the name of pulmonary apoplexy applied to the disease by one or two of these. In 1816, M. Léveillé appears to have read a memoir on this subject before the Academy of Sciences at Paris; and in 1817, Dr. Hohnbaum, of Hildburghausen, published an essay on a disease, which he designated *Pulmonary Apoplexy*. See his work "*Ueber den Lungenschlagfluss nebst einer Einleitung ueber Schlagflüsse überhaupt.*" Erlangen, 1817. M. Laennec's Treatise was not published until 1819. But no preceding writer has given the precise characters of the disease recorded in the text. Hohnbaum had met with only three examples of the disease described by him; and as there may be some doubt whether the affection is the same as that described by Laennec, or one of a different kind, I shall give a brief outline of two of his cases. The first occurred in a man forty years of age, who had been a very free liver, was subject to paroxysms of asthma, and for some time before his death incapable of using bodily exertion on account of a tightness on the chest which was produced by it. Without any precursory symptoms, this man fell down senseless as if struck by apoplexy. On examining the body on the following day, the brain and its vessels were found quite sound, and the latter rather empty, and the only morbid appearances observed were in the chest. Both lungs were distended with dark-coloured blood partly coagulated and partly fluid, and the pulmonary substance when cut in slices sunk in water. The same kind of blood was found in the bronchi. The right ventricle of the heart was also filled by it, while the left contained only half an ounce of it. p. 72.

The subject of the second case was a man thirty years of age, who had also lived well and was fat. He had been considered as in good health, except that he suffered from dyspnœa and head-ache upon attempting the slightest exercise on foot. This man took a long journey in a carriage in a very cold day, during which he drank freely. Upon returning at night he was found dead in the carriage, the driver having some time before observed him to be drowsy and somewhat inarticulate in his speech, which he attributed to intoxication. The brain was found perfectly sound, and with the vessels only moderately filled with blood, but there was slight partial thickenings and adhesions of the membranes. Upon opening the chest the lungs seemed too large for the cavity, distended with black blood, and almost like liver when cut into. The back parts of the lungs were most filled with the black blood, part of which was also found effused in the cavity of the chest. The right ventricle of the heart contained several ounces of the same kind of blood—and the left was empty. The heart and larger vessels were sound. p. 75. In neither case was there any spitting of blood.

Since the publication of Hohnbaum's little work, and the first edition of Laennec's treatise, a vast number of cases of pulmonary apoplexy have been recorded by different authors, the principal of which are referred to in the bibliographical notice at the end of the present chapter, and various opinions have been advanced respecting its causes and nature.

Hohnbaum, Lorinser, and other German pathologists, consider it as depending on a sudden paralysis of the pulmonary nerves, with a consequent comparative overaction of the blood-vessels of the lungs. This doctrine of local palsy and consequent effusion of blood, they extend to all the principal organs of the body, naming the affection *apoplexy* wherever it occurs, from a supposed identity of character with the cerebral disease commonly so denominated. Whether the explanation is correctly applied or not to the affection as it takes place in other organs, we may state with confidence that it is inapplicable to the very case which serves these pathologists as a prototype,—cerebral apoplexy being now well ascertained to depend generally on very different causes. It may, however, be more applicable to other organs than to the brain; and some countenance is given to this doctrine by the late discoveries of Mr. Charles Bell, and the demonstration by him and Mr. Shaw of the existence of local paralytic affections of the external nerves.

The most prevalent opinion, and in one class of cases unquestionably the true opinion, is, that pulmonary apoplexy depends essentially on disease of the heart, and

From what precedes, it is obviously impossible to distinguish, by the symptoms merely, the bronchial from the pulmonary

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particularly on those forms of disease which throw a preternatural volume of blood into the pulmonary vessels, viz. hypertrophy of the right ventricle or contraction of some of the orifices on the left side of the heart, or both conjoined. This view of the case seems to have been first taken many years ago by our countryman, Allan Burns; and the whole modus operandi of the cause is clearly explained in his treatise at p. 51 et seq. He, however, lays considerably more stress on the active effect of the hypertrophied right ventricle, than on the passive influence of obstructions to the escape of blood from the lungs through the pulmonary veins. But he notices this last also in the section "On the Effects of Change of Structure in the Valves," p. 163. "We shall take it for granted," he says, "that the [right] auricle and ventricle are each of them dilated so far as easily to contain *three*, ounces (in place of *two*, as he had supposed the case in health) of fluid, but that the pulmonary artery remains of its usual size. If the ventricle propels the whole of this blood, the consequence must be terrible; the ultimate branches of this vessel in the lungs will give way." p. 52. "The pulmonic vessels, by the congestion and continued *vis a tergo*, are ruptured; blood is forced into the air cells; hæmoptysis is produced; or, if urged still further, all the cellular structure of the lungs is crammed with blood; these organs cut like liver, and sink when put into water. This I am convinced from repeated observations is a frequent cause of hæmorrhage from the lungs; and I have seen several who have lost their lives from not preserving the muscular action with proper limits." *Obs. on Dis. of the Heart.* Edin. 1809. 8vo. p. 53.

The same explanation of the disease is given by M. Bertin, (Traité de Maladies du Cœur, p. 352,) by Bayle, (Revue Med. Avril, 1828,) by Hope, Dis. of the Heart, pp. 197, 211, and by M. Andral, (Clinique Medicale, p. 518:) and the latter author further considers the pulmonary apoplexy as differing from the common bronchial hæmorrhage in no other respect except that the effusion of blood in the former takes place into the very minute bronchial ramifications, instead of the larger bronchi, as in the latter affection. A review of the other very numerous cases of pulmonary apoplexy recorded by authors, places in a striking point of view the effect of disease of the heart in producing it, as this complication will be found in the great majority of the examples. Dr. Townsend informs us, that out of twenty-two cases examined by himself, fifteen occurred in individuals labouring under diseased heart; (Cyc. of Pract. Med. i. 138;) and we are disposed to regard this as not exceeding the general proportion of such cases. A very ingenious and rising young member of our profession, Mr. Henry Johnson, has recorded four cases of this disease occurring under his own notice, within a short space of time at St. George's Hospital, all of which were complicated with contraction of the left auriculo-verticular orifice; and he has endeavoured to establish a more definite relation between pulmonary apoplexy and this form of cardiac disease than between it and any other affection of the heart, a view which is adopted by Dr. Hope, (Dis. of the Heart. p. 197.) The same observation was made by Burns, who says, "when the mitral valve is obstructed we find that the blood, impelled by the pulmonary artery, meeting in its course a back stroke from the left auricle, produces rupture of the minute branches of those vessels in the lungs." p. 185.

There can, therefore, be no doubt, that many cases of pulmonary apoplexy are, as these authors suppose, owing to diseased heart; yet I think those best deserving this name; for instance those described by Hohnbaum, the case by Corvisart, and that by Haller, can hardly be attributed to this cause alone. It is not improbable that some of the instances of sudden death, usually attributed to cerebral apoplexy, or disease of the heart, may depend upon the disease described by Hohnbaum. In these cases, may not the state of the blood itself be sometimes the cause of the disease? At all events, I am disposed to consider a preternatural slowness of transmission of the blood through the lungs, whether depending on organic disease or not, as one predisposing cause of this affection. It is in this way I would account for the frequent occurrence of hæmoptysis under the influence of the depressing passions; and the pathology of which affection I would illustrate by referring to the physiology of *sighing*. Some of the most severe instances of pulmonary hæmorrhage that has come to my knowledge, have originated under the influence of grief and anxiety; and I look upon moral causes of this kind as a fertile source of many anomalous, yet most distressing functional affections of the lungs and heart. This view of such hæmorrhage. This end is frequently attained, however, by means of the physical signs afforded by percussion and auscultation. The hæmoptysical engorgement is usually of too small extent to be recognizable by percussion; and, besides, it frequently has its seat in those portions of the lungs which are beyond the reach of this means of diagnosis. However, when it exists to a pretty considerable extent, percussion elicits a dull sound over the corresponding parts of the chest; and I have met with instances where this was the case over the third part of one of the sides. The stethoscope furnishes us with two principal signs of this affection—the want of the sound of respiration over a small circumscribed space, and a crepitous rhonchus around this space. This rhonchus, which here indicates the slight infiltration of blood formerly described, is always found at the commencement of the disease, but is frequently wanting in the latter stages. When these signs co-exist with pulmonary hæmorrhage, we may be assured that the site of the discharge is in the pulmonary substance, and not in the bronchi simply. In the one case, however, as well as the other, there is found, at the roots of the lungs more particularly, a mucous rhonchus with large bubbles. These bubbles seem to be larger, thinner, and formed by a matter more liquid than mucus; they also *burst* more frequently, and with a peculiarity of sound which cannot be mistaken.

The hæmoptysical engorgement is, moreover, frequently accompanied by an exudation of blood from the bronchial membrane, which is almost always found much reddened, swollen, and somewhat softened, when the engorgement is of some extent, and more particularly in its vicinity. When the induration is extensive, the absence of sound on percussion, joined with the preceding signs, leaves no doubt of the nature of the disease, and prevents its being confounded with any other except peripneumony; and this only in cases where the spitting of blood is very inconsiderable. It is true that in both these diseases, there exists the same crepitous rhonchus, and also the same want of respiration and sound on percussion; but the local and general symptoms being entirely different in the two cases, there can very rarely be any doubt about the diagnosis. When the two diseases are combined, a thing which is of rare occurrence, the diagnosis is more difficult.* When a pneumonia supervenes

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cases seems to me explanatory of that singular effect of *nostalgia* noticed and described by Avenbrugger, viz. an induration of one lung, with consequent absence of the natural sound on percussion, terminating fatally. See my Translation of Avenbrugger in *Original cases*, &c. p. 24.—*Transl.*

* This complication, according to M. Rousset, is accompanied so constantly by one symptom that it may be regarded as pathognomonic: it is this; the expectoration is very copious and very fluid, appearing black when at rest, but presenting, when agitated, a colour like that of a solution of extract of liquorice. (*Op. Cit.* p. 35.)—(*M. L.*)

during the resolution of a hæmoptysical induration, there is a recurrence of the crepitous rhonchus, without any fresh discharge of blood, or with an expectoration of sputa tinged with blood, but possessing the tenacity of those of peripneumony. The concomitance of fever in the case of inflammation, tends further to strengthen the diagnosis. It is hardly necessary to remark, that when the hæmoptysical infiltration is suddenly formed, so as instantly to occasion suffocation, as in Corvisart's case, there is no time for the occurrence of external hæmorrhage. When the lesion is of small extent, and the failure of respiration in the affected part cannot on this account be discovered, it is sometimes difficult to determine whether the hæmorrhage is simply bronchial or not. In the beginning of the attack, the presence of the crepitous rhonchus will decide the question; later in the disease, the decision will be more difficult; but uncertainty in this case is of no practical importance. The crepitous rhonchus is by no means so constant during the resolution of hæmoptysis as during that of peripneumony.*

Occasional causes.—These are in general the same as those of the bronchial hæmorrhage. It is to be remarked, however, that the spitting of blood which accompanies the formation of tubercles, is most frequently of the latter species; while that which occurs in subjects affected with disease of the heart, is most commonly of the former kind. The suppression of habitual discharges—such as the menses, hæmorrhoids, or epistaxis—gives occasion to both kinds indifferently. Plethora and the sudden or long-continued impression of excessive heat or cold, ought also to be numbered among the occasional causes of this, as of many other diseases of a very different kind; but, in most cases, such causes are merely simple occasions, which could not of themselves have given rise to the disorder, without some peculiarity of constitution in the individuals.

It appears to me impossible to witness the immense losses of blood which sometimes have taken place in hæmoptysis or menorrhagia,—or the congestions which occur suddenly, and at the same instant, in all the internal and external organs, in epilepsy and certain cases of hysteria, without admitting, that the blood in such cases experiences a sudden dilatation. We know that

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* When pulmonary apoplexy terminates by the softening of a portion of the indurated lung and the consequent formation of an abscess, it may chance that this may suddenly burst into the bronchi and give rise to a sort of *vomica*. In this case, the patient expectorates a large quantity of a dirty red liquid, containing small specks like those we observe swimming in water in which fresh flesh has been washed, and immediately afterwards pectoriloquy will be found, evincing the emptying of the excavation. M. Rousset on two occasions verified the existence of a hæmoptysical abscess by this sign, as was proved by examination after death. "In other cases, however," observes M. Rousset, "the pulmonary tissue being gradually expectorated as it becomes liquefied, the excavation is formed slowly, and the quantity of matter expectorated at one time is too small to enable us to come to a like conclusion." (*Op. Cit.* p. 33.)—(*M.L.*)

sufficiently elevated to occasion a considerable
the atmospheric pressure, most persons spit blood,
vere hæmorrhages the blood is more liquid and
e than natural.

—This must be the same as in the bronchial
but the extreme danger which attends the hæ-
luration and the possibility of its resolution, ought
ldly use copious venesection from the onset of the
blood-letting of twenty or twenty-four ounces on
cond day, will have more effect in checking the
han several pounds taken away in the course of a
is even beneficial in general to induce partial syn-
of the first bleeding. In cases of this kind, the
austing the patient's str gth is without grounds, since
w that the most copious vene ection falls short of the loss
d sustained from pulmonary æmorrhage, in young and
st subjects, even in the course f a few minutes; while the
ilitating effect of the hæmorrhage is infinitely greater than the
f oduced by the lancet. Should the hæmorrhage
he pulse has become small and weak, and the
reduced, it will not be prudent to employ further
ction t to have recourse to derivatives, among which
atives are unquestionably the most efficacious. A drastic
a or cathartic frequently checks the hæmorrhage, and even
the hæmorrhagic *molimen*, especially if they are productive of faintness. This practice may perhaps appear bold to many practitioners; but it has the sanction of Sydenham; and I have employed it with success in cases of great severity. I have never seen any inconveniences of consequence result from it; and consider it as unquestionably preferable to the common practice of bleeding to eight or sixteen ounces, daily, for several successive days, and through the period of a whole month. As a general rule it is proper, in cases which appear to originate in the suppression of some other discharge, to make the artificial loss of blood *derivative;* but the application of leeches to the vulva or anus in such cases, must be deferred until after the vascular system is unloaded by one large bleeding from the foot or arm. It occasionally happens that both local and general bleeding, in place of proving derivative, seem, on the contrary, to excite hæmorrhage. I have noticed the return of the menses, and aggravation of menorrhagia, during the application of leeches to the epigastrium. General bleedings, more particularly those of small extent, appear sometimes to have a like effect on hæmoptysis; and cases of this kind are clearly those in which purgatives should have a trial.*

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* For the first part of the following note on this passage I am indebted to my friend, Dr. James Clark. "This fact is not generally known, though it is one of

In the pulmonary apoplexy, still more than in the bronchial hæmorrhage, it is of importance to have recourse to the means formerly recommended, after Sydenham, for preventing a relapse. Dry cupping over the whole trunk and extremities, after general and local bleeding, is one of the best means which we can employ. Blisters and sinapisms are of less frequent benefit; and the irritation produced by them seems occasionally to be propagated to the interior of the chest.

In two or three desperate cases I have tried the tartar emetic in large doses, in the manner which will be described in the next chapter; and have never seen any bad effect from it. On the contrary, it appeared to lessen the discharge considerably; but it did not certainly produce the same admirable results as in the case of inflammatory diseases.

When the hæmorrhage has become in some degree chronic, partial shower baths (by means of a watering pot) gradually changed from tepid to cold, are frequently of great service; and it is always proper to make the patient get up, every now and then, in order to keep the body cool. In the present case, still more than in the bronchial hæmorrhage, we must not give astringents and bitters until the disease has assumed a chronic character. The patient must be kept to the strictest regimen, more particularly in the onset of the disease; but if the discharge

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great practical importance. In a plethoric person threatened with apoplexy of the brain, or hæmoptysis, the application of leeches may, and I believe frequently does, decide the very occurrence of the disease it was intended to prevent. I have more than once seen slight hæmoptysis follow the application of leeches round the anus (and have warned patients not to be alarmed at it) when applied to obviate pulmonary hœmorrhage. In one case, a severe attack of hæmoptysis took place a few hours after the application of the leeches, requiring general bleeding, &c. A very small bleeding may also, as Laennec observes, produce the same effect; but independently of the quantity of blood abstracted, there is a sympathetic effect produced on the extreme vessels by the action of the leeches or the consequent flow of blood from their punctures, which is very desirable and useful when we wish to promote a sanguine secretion, as the menses; but may be injurious when we wish to obviate an effusion of blood from the extreme vessels: a general bleeding is by far the better practice in the cases under consideration."

A remarkable statement of M. Brousais on the effect of bleeding in cases where much blood has been previously lost, whether from hæmorrhage or otherwise, deserves notice in this place. He says that local bleedings are often injurious in chronic inflammations of the viscera where the stock of blood is small, as they usually *increase* the congestion already existing in them. (Doctrines Med. Prep. 267. p. lxv.) In another place (Ibid. vol. i. p. 115) he says—"where the loss of blood has been too great for the demands of the system, the fluids of the secondary and less important organs, are attracted to the chief viscera, immediately concerned in the preservation of life. Withdraw from the heart, the brain, the lungs, the stomach, their necessary and indispensable stimulus, the blood and its constant attendant, caloric,—and immediately the *materials of life* (materiaux de la vie) rush from all the other parts of the body, which have not so instant a demand for them." This statement—may I term it fact?—is of great practical importance. It seems corroborated by the result of the experiments made by Dr. Seeds and Dr Kellie, in bleeding animals to death; (see the first volume of the Transac. of the Edin. Med. and Chir. Society;) and I have myself observed many facts in practice which, in my mind, tend to confirm its truth.—*Transl.*

is prolonged, we must allow some liquid aliment, and gradually increase this as the strength decreases and the spitting of blood becomes less.[*]

CHAPTER VI.

OF PNEUMONIA.

UNDER the terms *peripneumonia* and *pneumonia*, the ancients comprehended all the acute diseases of the chest which are unaccompanied by any marked pain of the side. With most modern writers, I shall limit their application to the single case of inflammation of the pulmonary substance. This disease is one of the severest and most common, and, in cold and temperate climates, is productive of more deaths than any other acute disease. It has on this account much engaged the attention of medical men, who have examined it under various points of view. In the present chapter I shall treat of it under the following heads: 1. acute pneumonia, and its terminations by resolution and suppuration; 2. partial pneumonia, and pulmonary abscess; 3. gangrene of the lungs; 4. chronic pneumonia; and 5. latent and symptomatic pneumonia. I shall not speak of pleuro-pneumonia, or inflammation of the lungs complicated with pleurisy, until after I have treated of the latter disease. I shall then likewise examine the question, so much agitated during the last century, of the distinction between those two diseases, contenting myself at present with stating that nothing is more common than to find pneumonia altogether simple, or complicated only with so slight a degree of pleurisy, as in no respect to add to its danger or modify its progress.

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SECT. I. *Anatomical characters of Acute Pneumonia.*

Considered in an anatomical point of view, pneumonia presents three degrees, or stages, very distinctly marked and easily recognized, which I shall distinguish by the terms *engorgement* or *inflammatory congestion*—*hepatization*—and *purulent infiltration*.

First degree (*engorgement.*)—In this degree the lung is externally of a livid or violet hue, heavier, and much more solid than natural. It is, however, still crepitous, but much less so than in a sound state, and, on pressing it between the fingers, we perceive that it is injected by a liquid. It retains the impression of the fingers nearly like an œdematous limb. When cut into, it appears of a livid or blood colour, is quite injected with a frothy serous fluid, more or less sanguineous, which flows from it abundantly. We can still, however, discover very clearly, the natural alveolar and spungy texture of the viscus, except in some points, where the obstruction is more solid and compact, indicating the transition from the first to the second degree of pneumonia. This is the condition of lung entitled by M. Bayle *engorgement* (engouement.*)

Second degree (*hepatization.*)—In this degree the lung has entirely lost its crepitous feel under the finger, and has acquired a consistence and weight altogether resembling those of liver. From this circumstance, modern anatomists have named this condition of the organ *hepatization* or *carnification*. The former of these terms, which seems to have been first used by *Lælius a Fonte*, is sufficiently correct; the last is very improper, and would be more applicable to a morbid condition of the lungs to be hereafter described. In this, the second degree of inflammation, the lungs are frequently less livid externally than in the first variety; but they exhibit in their interior a redness more or less deep, which varies in different points from that of violet-grey to blood-red. With these different colours, which shade into each other like those of certain marbles, a striking contrast is formed by the bronchial tubes, the blood-vessels, the specks of black pulmonary matter, and the thin cellular partitions which divide the pulmonary substance into portions or lobules of un-

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* For want of a proper English term answering to this, I shall use *congestion* or *engorgement* in the limited sense in which *engouement* is used in the text.—*Transl.*

ese partitions, which in a sound state of the organ
erceived, become now more distinct. They fre-
o be unaffected by the inflammation, or to be
less degree, and their whiteness consequently ren-
n sometimes extremely distinct. If we cut in pieces a
of lung in this state, hardly any fluid escapes from it;
we scrape the incised surfaces with the scalpel, a small
of a bloody serum is expressed, which is more turbid
er than that formerly mentioned, and intermixed with
we frequently observe another kind of fluid, thicker,
hitish, and puriform. When the incised surfaces are
the light in a proper direction, the pulmonary substance
its cellular appe ce, and presents a *granular*
posed of small re ains, oblong, and somewhat
tteneu. s granular texture ears to me the distinguish-
tom characteristic of in nmation of the lungs, by
it may be best discriminated from the tubercular obstruc-
it exists only in this case and the pulmonary apoplexy.
granular appearance becom till more obvious when we
a portion of hepatiz ing. In this case, the pul-
tance seems to consist of an infinity of small grains,
void, very equal in point f size, and of the different
ady mentioned. These are evidently the air cells
to solid grains by the thickening of their parietes
obliteration of their cavities by a concrete fluid.* When
a lung is hepatized throughout, it seems, at first sight, to be
more voluminous than natural. This appearance is, however,
deceptive, and is occasioned by the inability of the lung to contract, on the chest being laid open, as in the sound state of the

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* This is also the opinion of Andral, who considers pneumonia as consisting essentially in inflammation of the air cells, the internal surface of which secretes at first a muco-sanguineous and then a purulent fluid. (Clin. Med. tom. ii. p. 312.) Andral's opinion is greatly corroborated by an experiment mentioned by M. Louis. (Recherches sur la Phthisie, p. 9.) He says, that if we throw an injection *gently* into the bronchi, we find the lungs marked by an infinity of small masses, which, when divided, afford precisely the granular aspect of this organ in a state of hepatization. Although inflammation of the pulmonary tissue is generally marked by the granular surface, it is not *always* so, as is supposed by Laennec. "In some cases," says Dr. Williams, (Cyc. of Prac. Med. vol. iii. p. 410,) the granular appearance is entirely absent. This uniform non-granular solidification of the lung, described by Andral, (Anat. Path. ii. 510,) and Chomel, (Dict. de Med. t. 17, p. 237,) is not recognized by Laennec; but from having seen the condition observed by the other authors, as an indubitable result of inflammation, I do not hesitate to describe it as a variety of hepatization." Dr. Williams differs also from the eminent authorities above named, as to the cause of the granular appearance when it does exist. "Many minute examinations," he says, "which I have made of hepatized lungs, have convinced me that the granulations contain no viscid mucus, nor does their appearance by any means confirm the opinion of Andral. They appear rather to consist simply of the little bunches of vesicles, (in which, according to Reisseisen, each minute bronchus terminates,) whose membranous tunics have become so swelled by the deposition of a soft albuminous matter in them, as well as from the increased size of their blood-vessels, that their cavities are obliterated." (*Loc. Cit.* p. 410.)—*Transl.*

viscus. I have frequently measured the chest in cases of pneumonia, both on the living and dead body, and have never been able to discover the least dilatation of the affected side;—a circumstance which, as we shall see hereafter, constitutes in itself a marked difference between the signs of pneumonia and pleurisy. It even appears that the inflamed lung, so far from being able to overcome the resistance opposed by the solid walls of the chest, cannot resist the slightest compressing cause. I once saw in a hepatized lung a depression more than a line in depth, accurately circumscribed, and exactly like a dint made by a hammer on a piece of lead, corresponding to, and evidently occasioned by, a spot of false membrane of the consistence of boiled white of egg. In this case, all the rest of the substance of the lung was united to the costal pleura by an organized cellular tissue, of much older date than the disease of which the patient died.*

Third degree (*purulent infiltration.*)—In this stage, the substance of the lung has the same degree of hardness and the granular appearance above described, but is of a yellowish-pale or straw colour. At first, the pus, as it begins to form, appears in small detached yellow points, increasing the motley-coloured shading formerly noticed. These points gradually combine, and the whole lung finally assumes a uniform straw, or lemon-yellow colour, and when incised exudes, in greater or less quantity, a yellow, opaque, viscid matter, evidently purulent, but much less offensive to the smell than the pus of an external wound. In this state, the pulmonary substance is much more humid and softer than in the red hepatization. The granulated texture gradually disappears as the purulent softening advances: and even before this latter stage has attained its acme, the parenchyma of the lungs gives way beneath the fingers like a soft clot. When the lung contains much black pulmonary matter, as is very commonly the case in adults and old persons, both the pus and the pulmonary substance assume an ash-grey colour, which has been recently denominated by some writers *grey hepatization.*† At other times, particularly in children and young persons, the infiltrated pus is of a fine whitish-yellow colour. This pus when first exhaled is concrete or plastic like the false membranes, and passes rapidly through different degrees of softening before it acquires its proper mucilaginous consistence. When it begins to soften, if the part containing it is pressed or scraped, it escapes under the form of a greasy matter, which a superficial observer might mistake for fat, but which is in reality albumen.[*] The state just described is, strictly speaking, the suppuration of the pulmonary substance. I shall presently have occasion to notice those rare cases, in which the pus is collected into one spot, constituting abscess of the lungs.

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* M. Broussais says, he has sometimes seen the impression of the ribs on hepatized lungs. This must be a mistake. The thing is impossible.—*Author.*

M. Broussais, in his *Examen*, published in 1821, (tom. ii. p. 718,) re-asserts the alleged fact of the impression of the ribs on the inflamed lungs. He brings in support of his assertion, the statement of Dr. Pessyn, who says, he saw the same appearance on the *lungs* of a man who died of an ancient *pleurisy*, in the year 1820. Frank makes the same statement as Broussais, De cur. Hom. Morb. vol. ii. p. 130.—*Transl.*

† This term, which is incorrectly applied to the state described in the text, inasmuch as the colour is not *grey*, but *yellow-greyish* or *ash-coloured*, is moreover improper, being applied to other morbid conditions of the lungs.—*Author.*

The three degrees of inflammation just described are very commonly re-united in various ways. Sometimes one lung is inflamed in the third degree, through its whole extent, while the other contains only some portions affected in the first or second degree. Frequently the three degrees are found in the same lung, dividing it into as many zones, strongly contrasted, or gradually and insensibly shading one into another. The transition of one stage into another is marked by the occurrence of some points of the more advanced degree amidst a part which is only affected in the inferior degree: in this way, the transition from the first to the second stage is indicated by a red tissue, containing much frothy and bloody serosity, but still crepitous, intermixed with which are some portions of a redder colour, much more solid, not at all crepitous, containing less fluid, and granular when incised. Sometimes these indurated portions are exactly circumscribed by a pulmonary lobule: and, in children more especially, we sometimes even find dispersed in the centre of the lungs, a certain number of lobules arrived at the stage of hepatization, while those immediately surrounding them are perfectly sound. This variety of pneumonia has in some recent works been denominated *lobular*. In these cases we may consider the inflammation as having commenced in several distinct points at the same time, and being interrupted in its course by the treatment or some other cause, has not extended to the rest of the lung, or, having extended to it in a slight degree, has terminated in resolution before death. We may convince ourselves of the correctness of this opinion by examining different lungs in different stages of resolution from inflammation.[†] The transition from the second to the third stage is marked by the existence of yellowish, irregular, uncircumscribed spots, amid a portion of lung inflamed in the second degree, the one colour passing insensibly into the other. It is this state of lung which, by the union of the two colours mentioned with the black or grey stripes produced by the black pulmonary matter, presents an appearance extremely like a piece of granite, composed of red and yellow felspar, grey quartz, and black mica.

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[*] Broussais has clearly fallen into this error. (Doct. Med. tom. ii. p. 735.)—Auth.

[†] M. Andral has described another form of pneumonia in which not whole lobules, but fractions of lobules, that is, certain air cells only, are inflamed. This *vesicular pneumonia* is recognized by the existence of red granulations disseminated, in greater or less numbers, in a portion of pulmonary tissue otherwise healthy. (Precis d'Anat. Path. t. ii. p. 509.) I am not sure that this form of disease ought to be recognised as a variety of pneumonia. I have myself never observed these *isolated* red granulations; but I have frequently seen lungs, which were otherwise healthy, appear, on being incised, as if they were sprinkled over with very minute ecchymosed points, resembling flea-bites on the skin. Is this the first stage of vesicular pneumonia?—(*M. L.*)

The lower parts of the lungs are those most commonly occupied by pneumonia;* and when the disease involves the whole viscus, it is almost always in the inferior part that it commences. When the three degrees of inflammation exist in different parts of the same lung, the site of the more advanced stage is usually in the same inferior portion. It is much more uncommon to find the inflammation confined to the upper lobe. It is not so unusual, however, to find a part of the centre of the lung inflamed, while the superficial portion is in a sound state. We never find the whole of both lungs inflamed in the third or even second degree; and this for obvious reasons; since an obstruction of this kind could not take place instantaneously, and must render respiration quite impossible. But it is by no means uncommon to meet with cases in which one whole lung and more than half the other are quite impervious to air. On the other hand, we find death take place before the obstruction has reached the fourth part of the organs of respiration; a fact which, as well as many others, proves that death is frequently occasioned much more by the exhaustion of the vital principle than by the extent or intensity of the organic alteration. The right lung is more frequently affected than the left, not only in cases of pneumonia, but in almost all the other morbid affections to which these organs are subject. This fact has been long noticed by practitioners and medical writers, and is noticed among others by Morgagni.†

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* This fact, which cannot be denied, proves how very inexact is the opinion of M. Broussais, that tubercles are the result of inflammation. If this were true, the inferior and not the upper lobes ought to be the principal site of these bodies; but the reverse is well known to be the truth.—*Author*.

This statement of our author seems less supported by some of our best pathologists, than might have been expected. Andral says, that out of eighty-eight cases of pneumonia, the lower lobe was affected in forty-seven, the upper lobe in thirty, and the whole lung in eleven cases; (Op. Cit. p. 317;) and Chomel informs us, (Dict. de Med. t. xvii. p. 209,) that in fifty-nine cases, the upper lobes were affected in thirteen, the lower in eleven, the whole of one lung in thirty-one, the posterior parts in two, and the middle in one. M. Broussais says, (Examen, tom. ii. p. 720,) that since the publication of M. Laennec's work, his (M. B.'s) pupils have very often shown him cases of hepatization of the upper lobe, with the view of pointing out Laennec's mistake. Frank states his experience to be the reverse of Laennec's:—"Frequentius forte *superiores* pulmonum lobos inflammatos deteximus." (De Cur. Hom. Morb. tom. ii. p. 132.) He says also, that he has not found the right lung more frequently affected than the left.—*Transl.*

† This is strikingly shown by the following statements:—M. Andral says, (Cl. Med. t. ii. p. 317,) that out of two hundred and four cases of well-marked pneumonia, the right lung was affected in one hundred and twenty-one, the left lung in fifty-eight, and both lungs in twenty-five. M. Chomel says, (Dict. de Med. t. xvii. p.

d partial inflammation of the lungs.—The species
n above described is the only one of common occur-
ıngs; for notwithstanding the opinion of the an-
u the common notions of mere practical physicians of
nt day, respecting pulmonary abscesses, which are
:d *vomicæ*, it is certain that there is no organic
ncommon than a real collection of pus in the sub-
lungs. The vomica of Hippocrates and our con-
ners is, as we shall see hereafter, the result of the
large mass of tuberculous matter. Among several
ctions of pneumonic subjects which I have made in
r more than twenty years, I have not met with a col-
n of pus, in an inflamed lu more than five or six times
were not of large extent, numerous in the same lung.
ey were dispersed in different p ts of the lungs, which were
he third degree of inflammation bove described. The walls
abscesses were formed by the pulmonary tissue, infil-
with pus, and in a st of soft disorganization, which
ally decreased as we rec rom the centre of the col-
When we forcibly drag n the cavity of the chest an
ng attached to the l pleura by old cellular ad-
, it frequently happens tha e parts most infiltrated with
s give way under the fingers, or without suffering any exter-
l wound, yield internally under he pressure so as to form a
soft sanious mass, which an inattentive observer might mistake
for a collection of pus:* if cases of this kind were received as
instances of pulmonary abscess, nothing would be more common.†

508,) that in fifty-nine dissections he found the right lung affected in twenty-eight, the left in fifteen, and both in sixteen: and he adds, that in the instances where both lungs were affected, the right was generally most so; and that the results afforded by the cases of recovery were precisely of the same kind. Autenrieth (*Physiologie*, § 1045) says, that the right side is most obnoxious to acute, and the left to chronic diseases. A more recent statement by M. Lombard, and on a still larger scale, strongly supports the same view of the case. He found that of 868 cases of pneumonia, 413 were on the right side, 260 on the left side, and 195 on both sides. (Archiv. Gen. de Med.) The general result of these united statements is, that out of a total of 1131 cases, the right side was affected in 562, the left in 333, and both in 236. Taking these results in round numbers, and approximatively, and assuming them to give a fair view of the general habitudes of the disease, we would say, that out of every ten cases of pneumonia, we might expect five, or one half, to be confined to the right side; three to the left; and two to extend to both.—*Transl.*

[*] Speaking of this condition of lung, Andral says, (Clin. Med. tom. ii. p. 510.) "Compressed between the fingers, it falls into a greyish pulp, which only differs from the infiltrated pus by being a little thicker. Owing to this great friability, if we force our fingers into any part of the lung, the cavity thus artificially formed is immediately filled with pus, and might be mistaken for an abscess."—*Transl.*

[†] It is, no doubt, this circumstance which has induced M. Andral (Clin. Med. tom. ii.) to propose to substitute for *hepatization* and *suppuration* the terms *red softening* and *grey softening*. But in the red hepatization, there is really induration, although the pulmonary substance is more humid than natural. The same is true of the purulent infiltration, so long, at least, as it is not converted into abscess. To express M. Andral's ideas, the terms *increase of humidity* would have been more appropriate.—*Author.*

Once only, during the space of time above mentioned, have I seen a collection of pus in the lungs, of considerable extent. This was situated in the middle of the lung anteriorly, was flat and elongated, and would have contained three fingers. The walls of this abscess had, properly speaking, no surface, the pus being observed gradually to pass into a purulent detritus, and this into a firmer tissue, still loaded with pus, as we receded from the centre of the collection: and at length, about half an inch from the matter, the purulent infiltration was not greater than it usually is in the third stage of pulmonary inflammation. In this case, as in all the rest where abscess was found, the inflammation occupied only a part of one lung. This circumstance may help to account for the infrequency of collections of pus in the lungs, as cases of partial peripneumony usually yield either to nature or art, while an affection of great extent produces death before the purulent infiltration is so far advanced as to form, by the destruction of the tissue containing it, distinct collections of pus.*

An English physician, Sir Alexander Crichton, has accused me of representing the occurrence of pulmonary abscess as much too rare. He considers this as taking place in more than half the cases of pneumonia, which have been badly treated. Professor Himly, of Goettingen, has made the same remark. If the opinion of these physicians is founded merely on the observation of symptoms during life, and this seems the case with Sir A. Crichton at least, it is evident that it can have no weight in deciding the question, purely anatomical, now under consideration. If, on the contrary, their statement reposes on morbid dissections, we must conclude either that cases of partial peripneumony are more frequent in the north of Europe, or that the observations of these authors have been made during a medical constitution when they were particularly prevalent. I have myself recently witnessed one of this kind. In the course of the year 1823, I met with more than twenty cases of partial peripneumony which terminated in abscess. All these patients afforded distinct pectoriloquy and an evident cavernous rhonchus in the place of the excavation; and from these and other signs to be noticed shortly, although I had an opportunity of proving my diagnosis by dissection in two cases only, the rest being all cured, I could affirm the existence of abscess in the others with equal certainty. Some of these abscesses were evidently of considerable extent, and yet perfect cicatrization took place within a period of from fifteen to forty days. In one patient who yielded pectoriloquy and the cavernous rhonchus over a space of three square inches, on the lower part of the right back, three months elapsed before these signs completely disappeared ; and in another case, where a much smaller abscess existed in the top of the left lung, they did not entirely disappear until after six months: previously, however, to this event, both these patients had long recovered their flesh and strength, and considered themselves as completely cured.*

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* The testimony of Broussais on this point is very strong. He says, (Hist. des Phleg. Chron. tom. ii. p. 111,) "If ulceration of the lungs without tubercles were common, we should meet with it in the military service more frequently than any where else, since, during winter, in climates only moderately cold, there is not one patient out of fifty in the hospitals, in whom the lungs are not more or less inflamed, and very few of these in whom, on examination after death, the lungs are not found indurated. Now, although I have never once omitted to examine, I never met with a case of ulceration without tubercles but once;" and in this case the inflammation was produced by a musket ball lodged in the lungs for six years. It is hardly necessary to observe how very different are the opinions of English writers respecting the frequency of pulmonary abscess. (See Baillie, Morb. Anat. p 70.) I believe they are wrong—misled (as I myself have been) by imperfect examination.—*Transl.*

One of the best proofs which I can give of the rarity of abscess of the lungs is derived from this fact, that notwithstanding the zeal with which morbid anatomy has been cultivated in France during the last twenty years, I know of only two well-authenticated instances of this affection, besides those above-mentioned. In a preparation presented by Dr. Honoré to the Royal Academy of Medicine, in 1823, there existed in the centre of a hepatized lobe, an excavation filled with pus and capable of containing a middle-sized apple. The patient had died of an acute pneumonia. The other instance is given by M. Andral, and occurred in the case of a man who died on the nineteenth day of the disease. The middle and lower lobes on the right side were in a state of purulent infiltration, and "towards the middle of the lower lobe, the tissue was found degenerated into a kind of paste, in the centre of which there was found pure pus. The substance of the lung surrounding this, gradually assumed more firmness in receding from the abscess." (Clin. Med. tom. ii. p. 313.)†

From the description just given of these purulent collections, it will be readily perceived how much they differ from those produced by softening of tuberculous matter. In these last, although the colour and appearance of the tuberculous matter are, in some cases, pretty much like those of pus, they generally differ in containing tuberculous fragments of a friable consistence. Besides the exact circumscription of the excavations, the solidity of their walls, the soft false membrane with which these are constantly lined, and the semi-cartilaginous membrane which occasionally succeeds to this, suffice to discriminate these from the purulent collections above described; independently of the difference of the stethoscopic signs, which characterize them respectively in the living body.

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* It is singular, after having so justly remarked that the opinions of Himly and Crichton would be inadmissible if founded merely *on symptoms observed during life*, that Laennec should have so immediately fallen into a similar train of reasoning. The stethoscopic signs, no doubt, deserve more confidence than the varying symptoms which depend on mere disorder of function; but it is no less obvious that they cannot be received as decisive evidence *of a question purely anatomical.* Moreover, in the greater number of the cases referred to, the existence of *distinct pectoriloquy* and *distinct cavernous rhonchus,* was not merely contestable, but was actually contested. Andral was, therefore, justified in asserting, (*Précis d'Anat. Path.* t. ii. p. 535,) that Laennec was in this case deceived by auscultation.—(*M. L*) I entirely concur in the opinions advanced in this note.—*Transl.*

† The infrequency of pulmonary abscess is confirmed by the testimony of M. Chomel, who states, that during a period of seventeen years, he had only twice met with unequivocal examples of it, if indeed so often. (*Dict. de Med.* t. xvii. p. [illegible].) Since the publication of the first edition of the *Clinique Medicale*, M. Andral has twice observed, in the lungs of new-born infants, abscesses bearing no resemblance to tuberculous vomicæ. In one of these cases the abscesses were numerous and large. (Clin. Med. 2*nd Ed.* t. i. p. 507 ; *Précis d'Anat. Path.* t. ii. p. 535.) Perhaps collections of pus are more common in the lungs of infants, which are naturally very compact, than in those of adults.—(*M. L.*)

Notwithstanding what I have stated of the great infrequency —and almost impossibility—of the formation of a great abscess of the lungs, the thing appears to occur in rare instances. Twice or thrice I have met with enormous excavations occupying nearly the whole of one lung, and which did not seem to originate in softened tubercles. Among others I may mention the case of a young man in the Necker Hospital, in 1822, who had in the inferior and middle parts of the right lung, a cavity capable of containing a pint and a half of fluid. The outer boundary of this cavity was entirely destroyed over a space of more than six square inches, and was replaced by the costal pleura, which adhered closely to the lips of the excavation. Seven or eight bronchial tubes opened into this cavity, which was lined by a strong false membrane, and contained only a bloody serosity. This lung contained no tubercles. Both metallic tinkling and Hippocratic fluctuation were observable, during life, in this excavation.*

Resolution of pneumonia.—When resolution takes place, before the inflammation has reached the second stage, the effused blood is absorbed, and the pulmonary tissue appears as dry as in the sound state, only red as if dyed; occasionally a serous succeeds the sanguineous infiltration. When the inflammation has reached the second stage, or hepatization, resolution then presents the following characters: the indurated parts become pale, passing from red or violet—first to violet-grey, then to a reddish flaxen grey, and finally to a pale reddish, the natural colour of the lungs; they, however, frequently retain a reddish shade for some time after they have become permeable to the air. While these changes of colour are taking place, the texture of the part becomes softer, more humid, and, when cut, exudes more serum than blood. This serum is, at first, intermixed with some very small air bubbles, and gradually becomes more frothy. The granular aspect of the part disappears, and the cellular vesicular character returns. At last the pulmonary tissue resumes its natural dryness and colour, but for some time still remains firmer, more elastic, and heavier, owing, no doubt, to a remaining thickening of the walls of the air cells. It is unusual for resolution to proceed equally in the whole inflamed parts. Some harder spots are found here and there, retaining the characters of hepitization in their centre, while their circumference gradually passes through the lesser degree into the sound texture of the organ. Frequently, also, we can perceive on the surface of our incisions, a slight violet or reddish patch, as if made by the stroke of a pencil, pointing out the site of the inflammation, after the part had been completely restored to its functions.

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* Was not this excavation rather the consequence of an apoplectic affection than of a true abscess of the pulmonary substance? I am led to think so from the bloody serosity contained in it.—(*M. L.*)

Even when it has reached the third stage, or that of purulent infiltration, peripneumony may still terminate in resolution by the absorption of the pus, and without disorganization of the pulmonary substance. At the commencement of this resolution, the yellow or ash yellow colour of the part becomes paler and whiter. The pus contained in it is intermixed with serum; and this in a short time is intermixed with small air-bubbles; and shortly after, the pus is so much reduced in quantity as to show itself merely under the form of small specks. The cellular and vesicular aspect of the viscus re-appears; it loses its hepatic firmness, and has now only the solidity possessed by the first degree of pneumonia or œdema; it is slightly crepitous, and does not always sink in water; but when incised the surfaces are still of a dirty yellowish or green colour, very different from the sound lung. If resolution is far advanced, this colour is the only morbid appearance left, except a slight serous infiltration, which is also eventually absorbed.

Previously to my use of emetic tartar in large doses, I had occasion to witness this resolution of pulmonary inflammation in a very small number of cases. Since I have adopted this practice, I have lost no patients affected with pneumonia, except such as were attacked by it in the course of other severe diseases; and even in cases of this kind, the resolution of the pneumonic affection was, in almost all of them, more or less advanced, at the period of death. The most interesting examples of this kind were afforded by persons labouring under diseases of the heart, or they occurred in old subjects who had long laboured under various chronic diseases. When I employed in my practice only blood-letting and derivatives, I was accustomed to see my patients die in the first days of the disease, and I always found the lungs affected with the inflammatory engorgement, or the hepatic induration, red or yellow. At present, the very small number who die under the use of the emetic tartar, evidently fall victims to the concomitant disease, and not to the pneumonia, since I almost always find this in the progress of resolution.

Duration of pneumonia and of its different stages.—Acute pneumonia is one of those diseases, which, from the rapidity and brevity of their course, and the shortness of the period in which treatment can be beneficially applied, demand the utmost attention and vigilance on the part of the physician. Its general duration, however, as well as that of each of its stages, is variable. I have several times seen the engorgement (or first degree) continue for seven or eight days, and affect the whole lung and part of the other, and prove fatal before the occurrence of any very distinct hepatization. This result was very common in the epidemic of 1803-4, (known by the name of *grippe*,) and occurred equally in cases where bleeding had been largely used, and where it had not been used at all. Two examples of the same kind are recorded by M. Andral (Clin. Med. tom. ii. obs. viii. et ix. p. 112. 115.) In other cases, on the contrary, particularly when the disease has attacked debilitated or very old subjects, or supervened in the course of another severe malady, the inflammation reaches the stage of purulent infiltration in the short space of thirty-six or even twenty-four hours. With the exceptions just stated, I think we may fix the duration of the different stages of pneumonia as follows: the obstruction or first stage usually lasts from twelve hours to three days, before passing to the state of complete hepatization; this lasts from one to three days before spots of purulent infiltration make their appearance; and the period of suppuration (from the time when the concrete purulent infiltration is distinctly perceptible, until this is completely softened to a viscid fluid) varies from two to six days. Blood-letting, derivatives, and resolvents or stimulants of the absorbent system, obviously retard the progress of the disease, and consequently prolong the period of the first two stages. Convalescence is rapid in proportion as the inflammation is of small extent, and has been early checked.

State of the bronchi.—The lining membrane of the bronchi is commonly very red in the portions of the lung affected by the inflammation; it is also occasionally swollen, and sometimes the redness extends over the whole bronchi, but both these cases are uncommon. In the stage of purulent infiltration, the membrane is sometimes pale, and sometimes entirely red or violet-coloured, and in both these cases it appears to be softened.

Sect. II. *Signs and symptoms of pneumonia.*

This is one of the diseases most anciently known; and before pathological anatomy (which has been prosecuted with zeal in every part of Europe since the time of Morgagni) had investigated the true nature of diseases, it was generally regarded as one of the internal affections most readily recognized. This, however, is far from being the case. It is not easily recognized except when it is uncomplicated, and has already attained a considerable degree of intensity. When complicated with another disease, and also in its very commencement, it remains latent, because its most usual symptoms are either frequently wanting, or are common to other diseases.

In the present section, I shall first notice the physical signs which characterise the disease in all cases, and from its very onset; I shall then speak of the symptoms depending on the disorder of the functions of the lungs, and examine how far, and in what cases these may serve as signs; and, finally, I shall describe the general symptoms and the progress of the disease.

Physical signs.—The crepitous rhonchus is the pathognomonic sign of the first stage of peripneumony. It is perceptible from the very invasion of the inflammation: at this time it conveys the notion of very small equal-sized bubbles, and seems hardly to possess the character of humidity. These characters are more marked, according as the inflamed spot is near the surface of the lungs. The sound of respiration is still heard distinctly, combined with the crepitous rhonchus; and percussion affords the natural resonance. The extent over which the stethoscope detects the rhonchus, indicates the extent of the inflammation. This is frequently hardly greater than the diameter of the instrument. The further we remove the cylinder from the point affected, the rhonchus becomes more obscure, and ceases to be heard altogether at the distance of two or three inches. In proportion as the obstruction increases and verges towards hepatization, the rhonchus becomes moister, and its bubbles more unequal and less numerous; the sound of respiration, which accompanied it at first, gradually disappears; and at last, as hepatization takes place, the rhonchus itself ceases to be heard.* At this period of the disease, the sound on percussion does not sensibly differ from that of health, unless the obstruction is very extensive, and already verging on hepatization. In this latter case, it becomes somewhat more obscure. But when the obstruction is confined to a small portion of the lung, or when it exists in the form of isolated masses here and there, percussion affords no information. This is also frequently the case, even in an extensive engorgement of the lower part of the right lung, on account of the natural obscurity of the sound in that region from the presence of the liver.

Such are the physical signs of pneumonia in the first degree. Of these the most important is unquestionably the crepitous rhonchus; inasmuch as it is invariably present, and from the very invasion of the disease; and exists in no other case, except in œdema of the lungs and pulmonary apoplexy, two diseases which are easily distinguished from this by their own peculiar signs and symptoms. M. Andral is mistaken in saying that the crepitous rhonchus sometimes exists in simple acute bronchitis; (Cl. Med. tom. ii. p. 333;) and I think this is evident from his own cases. From its constant presence in this disease, I regard it as the most practically useful of all the stethoscopic signs, inasmuch as it points out, in its very earliest stage, one of the most severe and most common diseases, and thereby enables the physician to apply his means with much more chance of success than he could have done even a few hours later.*

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* Andral (Op. Cit. p. 312,) considers the crepitous rhonchus as produced by the intermixture of the air and liquid secretion of the air-cells, in the same manner as the mucous rhonchus is produced in the bronchi. The following is the explanation of Dr. Williams:—"The distended vessels, and the serous effusion in the interstices press on the minutest bronchial ramifications, and partially obstruct the ingress of air into the cells to which they lead; whilst the viscid secretion of the mucous membrane, simultaneously inflamed, filling the calibre of the tubes thus narrowed, and yields to the air in respiration forcing its way through it in successive bubbles. The bubbling passage of air through a viscid liquid, contained in an infinity of tubes of equally diminished calibre, causes that regular and equable crepitation which constitutes the true *rhonchus crepitans.*"—Rat. Exp. p. 81.—*Transl.*

When the inflammation has reached the degree of hepatization, we no longer perceive in the affected part, either the crepitous rhonchus or the respiratory sound; and the absence of these phenomena is frequently the only sign we have of hepatization having taken place. Bronchophony exists in certain cases, particularly if the inflammation is seated near the roots of the lungs, or in the upper lobes, in which places the bronchial tubes are largest. When the pneumonia is central, bronchophony either does not exist at all, or is very obscure; it becomes more and more manifest, as the inflammation approaches the surface of the lungs. By means of this sign, I have frequently been able to indicate, previously to opening the chest, the precise point where a central peripneumony had reached the exterior of the organ. This is easily accounted for by the fact, that a hepatized lung is a better conductor of sound than a healthy one,—bronchophony being nothing more than the resonance of the voice within the bronchi of the inflamed part. A pleuritic effusion, if occurring subsequently to the hepatization, renders bronchophony stronger, by compressing and condensing the superficial parts of the lungs not yet affected by the inflammation; but the reverse happens when the pleurisy precedes the pneumonia. It is more especially when existing near the roots of the lungs, that bronchophony is rendered much stronger by the interposition of a small layer of fluid; and it is in this case that the co-existence of ægophony gives rise to the mixed phenomena described in the First Part. Bronchophony is always less strongly marked and more diffused, in the lower parts of the lungs, owing to the lesser diameter of the bronchi there; and becomes quite imperceptible in this situation if the corresponding parts of the pleura contain a fluid. The bronchial respiration and cough always accompany bronchophony; and the former are sometimes very distinct when the latter is not so. In this case, an attentive examination enables us to discover that the bronchial respiration and cough have their seat in the interior of the lungs, and that the superficial parts are still permeable to the air, or simply obstructed. If a rhonchus exists in the bronchi at the same time, the hepatization renders it much stronger and more distinct. When the hepatization is near the surface, and involves within it bronchial tubes of a considerable size, as when it has its seat at the roots or in the top of the lungs, bronchophony becomes then almost like pectoriloquy. In this case it is frequently accompanied by the sensation of *blowing into the ear*, and if a thin portion of pulmonary substance, not yet hepatized, intervenes between the ear and the affected bronchi, the sensation, denominated the *veiled puff*, is produced. As long as the inflammation increases, the crepitous rhonchus extends daily around the hepatized part, or arises in new points; it precedes the signs of hepatization, which commonly are found, on the following day, very distinct in those points where the crepitous rhonchus had existed the day before.*

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* M. Cruveilhier regards the crepitous rhonchus as a sign of no value in pneumonia, in comparison with those of bronchophony and tubary respiration. This opinion is tantamount to saying, that he only then yields confidence to the results of auscultation when the disease has advanced so far that its existence is self-evident. M. Chomel also asserts (Dict. de Med. t. xvii. p. 232) that this sign may be wanting in pneumonia, and be present in cases where the existence of inflammation is extremely doubtful. The doubts of men so eminent as Andral, Chomel, and Cruveilhier, demand from us some investigation whether there may not exist certain circumstances calculated to produce mistake respecting the value of the crepitous rhonchus. In the first place, it is possible that the *obscure mucous* rhonchus may be mistaken for it, the more so because the two are nearly allied both in their cause and character, and are, in truth, not easily discriminated by the most experienced. Secondly, the crepitous rhonchus may have been really heard during life, and yet no trace of inflammation be found after death, because this has taken place during the stage of resolution of the pneumonia. Thirdly, pneumonia may actually be present and yet the rhonchus be wanting, from the circumstance that the respiration is too feeble to force the air into the engorged vesicles, owing to the age of the patient, or the debility produced by preceding disease. For an analogous reason, of an opposite kind, the crepitous rhonchus may be sometimes perceptible when there is no pneumonia, in the case of children, the extreme power of whose respiration may excite in their diminutive bronchial ramifications a mere *mucous* rhonchus with bubbles as small as those which constitute the crepitous. —(*M. L.*)

These are the physical signs of hepatization; which is always further accompanied by a dull sound on percussion, over the affected parts; except in the case where the pneumonia is central. In this case, and especially if the hepatization occupies the centre of the left inferior lobe, and the lower part of the right side be naturally imperfectly sonorous, as commonly happens, percussion will frequently furnish us with no useful result, or will at most lead us to suspect the affection of the left lower lobe. For the same reason, if the hepatization occupies the right inferior lobe, percussion will only then enable us to recognize its presence, where we had previously ascertained the natural sonorousness of this part; since there are many persons in whom the right side of the chest, as high as the fourth or fifth rib, is naturally destitute of sound. In almost all cases, where the points hepatized are of small extent, percussion gives us no assistance.

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* It is an important practical precept—always to attend to the presence of an unequally strong, although still perfectly pure or healthy respiration; as it almost always indicates obstruction in some other part of the same or opposite lung. This is especially the case in pneumonia.—*Transl.*

Signs of suppuration.—The infiltration of pus within the pulmonary tissue furnishes no new sign so long as the pus remains concrete. When this begins to soften, we perceive in the bronchi a more or less distinct mucous rhonchus, occasioned either by the introduction of the pus into them, or by a more copious catarrhal secretion which then takes place.

Signs of abscess.—When the pus is not absorbed or expectorated in proportion as it becomes softened, but collects into one spot, a very strong mucous or cavernous rhonchus, with large bubbles, is perceived over the site of the abscess. The bronchophony is converted into pectoriloquy, and the respiration and cough change from bronchial to cavernous. If the abscess is near the surface, the respiration and cough yield the *puffing respiration*, and, according to circumstances, the *veiled puff.* These signs are almost always easily distinguished from the analogous phenomena which exist in hepatization, viz. bronchophony, bronchial cough and respiration, and bronchial mucous rhonchus. A little experience will enable us to discriminate the *bronchial* from the *cavernous* phenomena. The latter always are distinctly circumscribed, and appear to have their site in a space larger than any bronchial trunk. The intensity of the rhonchus when the abscess is only half full, the stuttering sound of the pectoriloquy in the same case, and the small extent of the peripneumonic affection (which had either been partial from the beginning, or is now become so by the resolution of the remaining parts), are additional signs which in most cases leave no room for doubt. On the other hand, the bronchial phenomena are remarkable by their *diffused* character; bronchophony when most like pectoriloquy, always differs from it in this respect: moreover, in bronchophony the voice rarely traverses the whole extent of the cylinder; it is also *pure* in this case, or, if accompanied by a mucous rhonchus, which is not common, this has never the exact circumscription, and rarely has the intensity, of the cavernous rhonchus.*

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* This distinction between the *bronchial* and the *cavernous* phenomena is of great practical importance. But the question for consideration is—whether these cavernous signs really do exist sometimes in pure pneumonia? Two events must have been previously established before we can resolve this question in the affirmative: 1st, the existence of an excavation in the lungs containing pus, communicating with the bronchi, and partly empty; 2dly, the co-existence along with the cavernous signs (in certain cases at least) of a considerable expectoration of pus, coming on rather suddenly; for it is evident, that so long as the abscess consists in a close bag of pus amid a mass of hepatized lung, (and this is the only form in which pulmonary abscess has yet been observed,) there can be neither pectoriloquy nor the caver-

Signs of resolution.—When resolution takes place before hepatization has supervened, the crepitous rhonchus becomes daily less perceptible, while the natural sound of respiration becomes gradually more distinct, and at last is alone heard. When hepatization has taken place, its resolution is invariably announced by the return of the crepitous rhonchus. I have never seen this sign wanting in any case which I have been able to examine daily: I commonly denominate it—*the renewed crepitous rhonchus (rhonchus crepitans redux).* M. Andral has noticed it in most of his examples of pneumonia cured (obs. xi. xii. xiii. xv. xvi. xxxviii. xxxix.) To the crepitous rhonchus is gradually joined the natural sound of respiration, which becomes daily more distinct, and at last exists alone. The crepitous rhonchus equally announces the resolution of the pneumonia when it has arrived at the stage of suppuration; but in this case it is usually preceded by a mucous or submucous rhonchus, indicating the softening of a part of the pus. In this case the natural sound of respiration returns much more slowly than in the preceding instances. At the expiration of a few days, or even sometimes of a few hours, the crepitous rhonchus becomes subcrepitous, indicating the supervention of œdema, which usually attends the resolution of this stage of pneumonia. The same thing is observed when œdema accompanies the resolution of the other two stages of the inflammation. When the disease has extended to the greater part of the lungs, the extreme points and the parts most recently attacked are usually those in which resolution commences: the contrary, however, is sometimes the case.

There are some cases in which it is more difficult to obtain the physical signs of peripneumony, especially in the early period of the disease. These difficulties are owing—1, to the inflammation being seated in the central parts of the lungs, and—2, to its being complicated with other affections. M. Andral met with these difficulties, and he appears to have exaggerated their degree; as he goes so far as to say, that not only the central pneumonia, but those seated at the roots and base of the lungs, cannot be ascertained by auscultation. I can however state, as the result of my own experience, that I have only met with a single case of what appeared to me pneumonia, in which the stethoscopic signs were wanting. In this case, there was expectoration for one or two days of the real peripneumonic sputa, to be hereafter described, and which have always appeared to me to coincide with the first stage of the disease; but on examination I detected neither crepitous rhonchus nor bronchophony;

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nous rhonchus. Now, I think it necessary to remark, that in the greater part of the cases cited above by Laennec, as examples of pulmonary abscess cured, the essential co-existence of purulent expectoration with the cavernous phenomena was not observed; neither did there exist that *exact circumscription* which these phenomena ought to present.—(*M. L.*)

The six first cases of M. Andral (obs. xxx.—xxxv.) were of the same kind, being very slight, indicated only by peculiar expectoration, and all terminating in prompt resolution. In opposition to these, I might here adduce a vast number of cases, in which not only myself, but pupils who had not practised auscultation six months, have recognized, by means of the crepitous rhonchus, central pneumonia of not greater dimensions than an almond or filbert. (See Case IV.) I would therefore affirm, in conclusion, that, if examined from the very beginning, central peripneumonies, and those denominated *lobular*, (which begin in many small points at the same time,) are very easily recognized in most cases, and only require particular care when the inflamed portions are very small. It is moreover to be here observed, that cases of this kind are slight, and are unattended with danger unless they extend; in which case the stethoscopic signs become distinctly evident, and in sufficient time for practical purposes. I have often ascertained the presence of small inflamed points at the roots and base of the lungs. In the former place, more particularly, we can often recognize the crepitous rhonchus at a great depth; and when it is at the surface, it is as readily heard as in any other point. Small inflamed spots, in the centre of the base of the lungs, are unquestionably more difficult of recognition than any other; yet even here the crepitous rhonchus is often very distinctly perceived. But we can not only recognize the existence of pneumonia of moderate extent in the centre of the lungs, but we can also ascertain that it is central. In this case, at the beginning, the crepitous rhonchus is heard profoundly in a circumscribed spot, while more superficially the ordinary murmur of respiration is heard pure, and sometimes almost puerile. The last character is especially observed when there are several spots inflamed at the same time. When the stage of hepatization supervenes, the bronchial respiration is heard profoundly, while the ordinary respiration is heard on the surface. Sometimes even we can ascertain a profound bronchophony and bronchial cough. The peculiar and distinctive character of these phenomena, when profound or superficial, can easily be ascertained by a person of only moderate experience. I have known pupils, who had practised auscultation only three months, make the distinction without hesitation. This distinction is of great importance; as it is in the diagnosis, and consequently in the treatment of pneumonia, as I have already remarked, that the greatest practical benefit of auscultation will be found; since every physician will be ready to admit, that the earlier we ascertain the existence of this disease the more easily is it cured. When a central peripneumony approaches the surface, we perceive that the superficial sound of the natural respiration occupies a smaller space at each succeeding exploration; while the bronchial respiration and bronchophony gradually approach the surface, and finally reach it, within a space which, at first, might be covered by the finger.*

Of all the affections of the organs of respiration which may be combined with pneumonia, the suffocative catarrh is unquestionably that which most marks its characteristic signs. If the pneumonia is of a very small extent, and supervenes to the catarrh, it is possible that it may be masked by the presence of the very loud mucous rhonchus which exists over the whole bronchi. It is this circumstance which renders the *pneumonia of the dying* so difficult to be recognized. However, even in this case, as often as I have wished to ascertain the pneumonia, in order to examine the pupils, I have always been able to perceive the crepitous in the middle of the mucous rhonchus. As far as regards the complication with the suffocative catarrh, (which is, by the way, a very rare disease,) the difficulty of diagnosis is of no practical importance; for when this complication takes place, either the patient dies before the pneumonic affection is in itself of any severity; or if the progress is slower, the crepitous rhonchus and other signs of pneumonia make their appearance. The dry catarrh would at first sight seem to be a very likely means of preventing the development of the crepitous rhonchus; while the frequency of this affection would thus cause pneumonia to be frequently mistaken, especially at its onset. I have not found in practice, however, that the crepitous rhonchus was more difficultly perceived in subjects affected with dry catarrh than in others: I have only observed that the respiration does not become so puerile in the sound parts as in other cases. It is probable that the inflammation of the pulmonary substance produces, at least in the first instance, a *derivation*, which unloads the smaller bronchial ramifications. A tumour which should entirely compress the large bronchial trunk would, no doubt, cause all the stethoscopic signs to disappear; but I know of no example of such a case; and we have already seen, that a polypus occupying nineteen-twentieths of the diameter of one of the principal bronchi, did not impede the manifestation of pectoriloquy and the cavernous rhonchus. Had this patient been attacked with pneumonia we ought equally to have heard the crepitous rhonchus.

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* I can hardly agree with our author as to the certainty of detecting all the preceding varieties of partial pneumonia by the stethoscope. His tact and experience were certainly matchless; and no doubt he did what few of his followers can accomplish. At all events, I think *the student* ought hardly to expect to compass so minute a diagnosis; as failure might weaken his confidence in the unquestioned and unquestionable powers of the instrument. The following remarks on this point, by Dr. Williams, are particularly deserving the attention of the young practitioner:—"It has always appeared to me, that the more the student in auscultation holds in view the pathological state on which the signs depend, rather than those signs themselves, and habitually reflects on their physical mechanism, as far as it is known, without empirically dwelling on the names or bare descriptions of sound, the more surely will he estimate the value of this method of diagnosis, and the more instruction will he receive from it. He will thus see that central peripneumony may be so situated as to yield sometimes no physical symptom, and at others these to be discovered only by a very careful examination; and hence he will see the impropriety of a partial method of diagnosis, and the great importance of attending to the sputa and other indications. When the inflammation is extensive, all these difficulties vanish, and the more intense and puerile respiration in the sound portions of the lung, depending on the more rapid and forcible passage of the air in them, further shows the infringement that has been made on the proper function of the organ." (Cyc. of Pract. Med. vol. iii. p. 421.)—*Transl.*

Symptoms depending on the disorder of the functions of the lungs.—These usually are—an obtuse and deep-seated pain, dyspnœa, quick respiration, cough, and expectoration of a peculiar kind. To these symptoms, decubitus on the affected side is commonly added; but nothing is more variable than this. The other symptoms are more constant, though each of them may be wanting, and even, in particular cases, all of them may be so at the same time. Moreover, they may all co-exist in many other diseases as well as pneumonia; and each of them exhibits many varieties. Thus the pain, which is commonly slight and extensively diffused, is sometimes confined to a point, even when there is no accompanying pleurisy. However, when it becomes very acute, it is commonly on account of the inflammation being extended to some part of the pleura. The dyspnœa is often hardly perceived by the patient, although the frequency of the respiration points it out to the physician; in some cases this is not more frequent than in health. When dyspnœa does exist, the inspection of the chest will not enable us to decide whether or not it depends on an organic affection of the lungs, as the dilatation of the chest and the elevation of the ribs are often equal on the sound and diseased side,—a remark which has also been made by M. Andral (Op. Cit. p. 330.) The cough is commonly frequent and pretty strong; but sometimes it is so slight as to be denied by the patient and the attendants. The expectoration in a great many cases has an appearance quite characteristic, and which, in my opinion, may by itself enable us to recognize the disease, as I have never met with it in any other. These sputa, which I shall term *glutinous* or *pneumonic*, when received into a flat and open vessel, unite into so viscid and tenacious a mass, that we may turn it upside down, even when full, without the sputa being detached, although they may partially hang from the vessel's mouth. If we shake the vessel its contents vibrate like jelly, but in a less degree. The colour of this expectoration is frequently some shade of red, particularly that of rust; or it is sea-green, tawny, orange, saffron, yellowish, or a dull green. These various colours are frequently intermixed, in stripes, in the same spitting-pot; and are evidently owing to blood existing in a greater or less proportion, or more or less intimately combined with the expectorated matter. The shades of green appear to me to depend on the same cause, although they constitute the bilious sputa of Stoll and his disciples. Certain it is, that I have frequently met with them in cases where there existed no bilious complication; although I must admit, at the same time, that I have sometimes seen them disappear, after bilious evacuations. The entire body of the expectoration has a semi-transparency like that of horn, and sometimes it is almost as transparent as white of egg very slightly coloured. Air-bubbles, of unequal size and sometimes very large, are contained in great number in the expectoration, and cannot escape on account of its great tenacity. If sputa of this kind existed constantly in pneumonia, we should require no other sign to indicate its presence. They commonly appear in the stage of engorgement, and retain their character until hepatization is well advanced; they then vary much from the characters above described, as we shall see presently. It is to be remarked, however, that, even in the first stages, they do not always present the strongly-marked features we have just described. Frequently they are less viscid, little coloured, and nearly destitute of air-bubbles; and at other times we perceive only a few *glutinous* and slightly tawny sputa, amid a great mass of mucous or pituitous expectoration. Pretty frequently, the characteristic sputa are observed only at the very onset of the disease, and during a few hours; and sometimes they do not show themselves even at this period, or they are in such small quantity as hardly to admit of being collected. This appears particularly the case in old subjects, and in very rapid attacks, and also in the pneumonia of the dying. The character of the expectoration is much more marked in certain epidemic constitutions than in others. This was particularly the case in the catarrhal epidemic of 1803, denominated the *grippe*. The numerous cases of pneumonia which occurred during the winter of this year were all marked by the peculiar expectoration; which was so very different from that attending the prevailing catarrh, that M. Bayle and myself, who noticed it then for the first time, were surprised at not being able to find an exact description of it in authors. Since that time, on the other hand, I have seen constitutions in which the *glutinous* expectoration was unusual, and much less strongly marked. During the period of hepatization the expectoration is slight and variable in character; it usually consists of a small quantity of pituitous sputa, more or less viscid and vitriform, or of a whitish or yellowish and half-opaque mucus. After the purulent infiltration occurs, the expectoration is more decidedly mucous, and like that in the latter stage of catarrh. Sometimes it contains specks of a yellowish-white colour not unlike milk, as if from an admixture of pus: rarely the expectoration becomes entirely purulent. Lerminier and Andral consider an expectoration of sputa, which seem to consist of a mixture of blackish blood and diffluent pituita, as characteristic of the period of suppuration. I have frequently met with this kind of expectoration, which greatly resembles the juice of prunes, (as M. Andral has remarked,) but as it always appeared to occur in cachectic subjects, with spongy bleeding gums, and even in persons without any pneumonic affection, I have not paid particular attention to it as a sign of pneumonia. I do not even think that the opinion of M. Andral is satisfactorily made out by a reference to his own cases.[*]

General symptoms and progress.—Pneumonia is attended by active fever from its very invasion. It is only in very rare cases that this is wanting, or even that it is inconsiderable; indeed, this happens only when the disease is partial, and of small extent. The presence of this degree of fever accounts for the flushing of the face, and the various sanguineous and serous congestions, which such a state of the system usually occasions in the brain and its membranes, and in the intestinal canal. When the determination of blood to the head is very great, and marked by coma in the beginning of the disease, as often is the case in old persons of a plethoric habit, the symptom is extremely unfavourable; as the patients in whom it occurs usually die before hepatization is completely established; or the inflammation reaches the stage of purulent infiltration in the space of a few hours. A furious delirium is a much less dangerous symptom.[†] Congestion of blood in the stomach is indicated by a very intense redness of the tongue, and sometimes by its becoming soft (par son ramollissement.) It is unusual for the epigastrium to be very painful; or, rather, it is hard to say whether the patient suffer from pain in the stomach, produced by the pneumonia, or from the impediment thereby occasioned to respiration. Diarrhœa sometimes takes place, especially if the fever is of some standing. In respect of this symptom, I would observe, in common with most practitioners, that it is not a bad sign, especially if it comes on towards the latter part of the disease, and is moderated. The pneumonic fever may be accompanied by a bilious affection; a complication which was very common towards the close of last century, but which is now extremely rare. Almost all the pneumonia observed by Stoll were bilious; and I was myself witness of many similar cases when I attended the lectures of Corvisart. Since 1804, however, I have met with no well-marked example of the kind. I formerly remarked, that we must be cautious in admitting the presence of bile in the expectoration, even when this is of a greenish yellow. The fever in pneumonia is truly symptomatic, that is to say, is the effect of the inflammation. It rises and falls with the inflammatory orgasm. It even frequently happens, that as soon as this latter is checked by the lancet or otherwise, the fever ceases entirely, although the perfect resolution of the pulmonary engorgement will not be accomplished in less than a fortnight, three weeks, or even a month. Occasionally when the resolution takes place slowly, after the patient has been free from fever for several days, the pulse resumes its frequency, (but not its fulness), and the skin becomes somewhat heated. This febricula, however, is not usually followed by any mischief, and frequently does not even prevent the return of a good appetite. There are cases of a different kind, where the fever continues, and with equal severity, although the inflammation is in the progress of resolution. In these, the pneumonia is complicated with an *idiopathic*[*] fever, or, at least, a fever depending on other causes than the inflammation of the lungs. During the acute stage of pneumonia, the urine is of as deep a red as if it held blood in solution; and this character is as strongly marked in it as in any inflammatory disease whatever. The blood drawn from the veins quickly coagulates, and exhibits a thick coat of fibrin, especially at the first bleedings.

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[*] The safest conclusion to come to, in my opinion, respecting this *prune-juice* or *liquorice-juice* expectoration in pneumonia, is to regard it as indicative of the complication with pulmonary apoplexy, in every case where the condition of the gums, &c., does not indicate a cachectic or scorbutic diathesis. It is, at least, much more probable, that the darkish hue and great liquidity of the sputa, should be owing to blood rather than to pus.—(*M. L.*)

For a very excellent and full account of the expectoration in peripneumony, I refer the reader to Andral's admirable work so often quoted, p. 339. The variety of expectoration just noticed as resembling the juice of prunes, or of liquorice, is noticed by Huxham as occurring in scorbutic patients. He describes it as "livid, gleety, and sanious, frequently resembling the lees of red wine, sometimes more black," &c.—*Essay on Fevers, &c.* p. 210. I would here remark, that Huxham gives a fuller account of the varieties of expectoration in pneumonia than any other English author, although his account is very defective. It is, indeed, surprising to observe how little attention is paid by most of our practical authors (and, I might add, practitioners) to this most important symptom, while every trifling and insignificant variety of pulse, tongue, stools, &c. is dwelt on with tiresome minuteness. I would particularly request the attention of young practitioners to the expectoration, in all diseases of the lungs; and can assure them they will derive more useful information from it than from many other things they are accustomed to observe with much greater care. A spitting-pot I consider as an essential part of the bed-room apparatus of the pulmonic patient, and its daily inspection as an imperative duty of the medical attendant. To those who do not practise auscultation, this kind of observation is particularly necessary, as otherwise they will constantly be deceived in their diagnosis. Children generally swallow their expectoration; young persons, and even adults, often do the same; and I have more than once discovered the existence of pneumonia in such cases, by taking measures to obtain a sight of the sputa. —*Transl.*

[†] The general opinion of writers is, that delirium is an extremely dangerous symptom. It is so stated by Cullen, Frank, &c. Lommius says, (Obs. Med. Lib. secund. p. 136,) "Potissimum lethalis est cum insaniam movit." I remember the late Dr. Gregory to have stated in his lectures that he had only known one patient recover who had had delirium.—*Transl.*

Pneumonia frequently terminates favourably by a distinct crisis, not only in the cases where the mildness of the attack, or ignorance of its character, have occasioned the disease to be left to the unassisted efforts of nature, but even when repeated venesections have been employed without any benefit. The most common of these critical evacuations is a lateritious or white sediment in the urine; and we should distrust any other, unless this also occurs at the same time. After this deposition, a sweat and moderate diarrhœa are the most common forms of crisis. A copious expectoration of mucus is also sometimes critical, but much less frequently than the practitioners of the last century believed, unless, indeed, it be in those cases which occur during the course of a catarrhal epidemic. Physicians of the present age, even those most devoted to the Hippocratic method, pay, in general, but little attention to the crises and critical days of pneumonia; the rarity of the instances wherein the efforts of nature suffice for the cure of the disease, leading them to bestow all their attention on the indications of cure. We owe, on this account, more consideration to M. Andral, for having taken pains to verify this point of doctrine in his cases (Op. Cit. p. 365). Out of one hundred and twelve cases of pneumonia, he found forty-three give way on the 7th, 11th, 14th, or 20th day,—viz. on the days most usually critical, according to Hippocrates. In twenty-six other cases, the days could not be ascertained. In general, if we observe attentively, we shall almost always find that the solution of the disease, even when effected by repeated venesections, is attended by a critical deposition in the urine, or a moisture on the skin.

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[*] I make use of the term *idiopathic (essentielle)* for want of a better, to express the general diseases, denominated by the ancients simply—*continued* or *intermittent fevers*. No doubt, before the cultivation of morbid anatomy, practitioners confounded with these fevers many others, which are in reality the symptom of an internal inflammation. At the same time, it is no less true, that both fact and reasoning accord in demonstrating that the lesions found in the intestinal canal, and which M. Broussais considers as the cause of continued fevers, are, in reality, the consequence of these.—*Author.*

Occasional causes.—The most common of these is the impression of cold, either long continued, or received when the body is moderately heated and covered with perspiration. This cause is much less powerful when the cold immediately succeeds to an excessive heat, and is not prolonged for a considerable time. The Russian who rolls himself in the snow after coming out of the hot bath, or the baker who goes from his heated oven, almost naked, into an atmosphere of a temperature below zero, is not liable to attacks of this disease: while the porters, whose occupation leads them to stand for a length of time at the corners of streets, are frequently affected by it. In general, pneumonia is a disease of winter and of cold climates:* it is rare in the equatorial regions. The poison of serpents, particularly that of the rattle-snake, frequently induces this disease, and the same result follows the injection of various mendicamentous substances into the veins.* It is probable that the epidemic peripneumony is often owing to an analogous cause, that is to say, to deleterious miasms which have entered the system by means of the cutaneous or pulmonary absorbents; since nothing is more common than to meet with cases of this disease to which we can assign no occasional cause. How many persons are seized with it in their very chambers, and in spite of the utmost care taken of their health! Most pathologists reckon fulness of blood, youth, manhood, and a strong constitution, among the predisposing causes of pneumonia. It is no doubt true, that, in subjects possessing these conditions, the inflammation is more acute, the fever higher, and the disease more readily recognized and cured; but it is no less true that pneumonia is much more common and fatal in old persons: it is in such subjects, more particularly, that the disease runs rapidly into suppuration. Children are likewise very subject to it, and the more so the younger they are. In them the disease is frequently mistaken, because they swallow the expectoration; and death most commonly takes place in the stage of engorgement, or after the supervention of only a lobular hepatization, that is to say, a hepatization occupying only some detached points. The facility with which they fall victims to this affection even in its onset, is explained by the greater necessity of respiration at this period of life.†

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* The following statistical results, extracted from Dr. Williams's excellent Treatise on Pneumonia in *Cyclopædia of Pract. Med.*, illustrate this point satisfactorily: they are, indeed, only in accordance with the common observation of practitioners. "Of ninety-seven cases recorded by Louis in Chomel's wards at La Charité during five years, eighty-one occurred between February and August, and only sixteen in the remaining five months of these years. Of the cases described by Andral, the number occurring in March and April amounted to a third of the whole: the fewest took place in May, October and November, and the remaining months had an equal share. Of two hundred and forty-three cases which were treated at the Edinburgh New Town Dispensary during three years, ending September 1, 1824, sixty-seven occurred from 1st September to 1st December; one hundred and four from 1st December to 1st March; ninety-four from 1st March to 1st June; and sixty-eight from 1st June to 1st September. We have observed in London nearly an equal preva-

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lence of the disease from the beginning of December to the end of April, and a considerably smaller proportion in the remaining months; but it appears generally that the latter winter and early spring months are most fertile in producing pneumonia in these climates."—*Transl.*

* These well-known facts, and others of an analogous kind, tend to confirm the truth of some of the formerly exploded, but now reviving, doctrines of the humoral pathology. Many physiological and pathological facts can only be explained on the supposition of an immediate alteration in the composition and qualities of the circulating fluids.—*Transl.*

† The following statement by M. Chomel in the 17th volume of the *Dict. de Med.* Article, *Pneumonie*, p. 211, will throw some light on the liability of different ages to this disease. He says, that out of fifty-six individuals affected with pneumonia, twenty-eight were from twenty to thirty years of age; nine from thirty to forty; eleven from forty to fifty; and eight from fifty to sixty; while, on another occasion (the epidemic of 1812-13,) of one hundred and thirty-four patients, thirty-eight were from fifteen to thirty years of age; thirty-four from thirty to forty-five; thirty-six from forty-five to sixty; and twenty-eight above sixty. Children are not admitted to *la Charité*, the hospital from which these statements are drawn; but respecting the great prevalence of this disease in infancy, the testimony of M. Guersent, physician to the *Hôpital des Enfans*, and a person of vast experience, is very strong. He says (*Dict. de Med.* tom. viii. p. 96) that "three-fifths of the children that die in the hospitals between birth and the conclusion of the first dentition, die of pneumonia, chiefly in a latent state." The fatality of inflammation of the lungs in children, is, no doubt, greatly increased in their case, by the difficulty of the diagnosis, owing to particular circumstances connected with their tender age. In no case is the stethoscope more useful than in this; as it supplies, at once, by its infallible indications, the otherwise unsurmountable deficiencies in the diagnosis, occasioned by the inability of the patients to explain their feelings, the deglutition of the sputa, &c.—*Transl.*

SECT. III.—*Of Gangrene of the Lungs.*

This is rather a rare disease. It can scarcely be ranged among the terminations of pulmonary inflammation, and still less can it be considered as the consequence of its intensity; since we find, in cases of this kind, the inflammatory character very slightly marked, as well in regard of the symptoms, as of the engorgement of the pulmonary substance. It would, on the contrary, seem, in most cases, to approach the nature of the idiopathic gangrenes, such as the anthrax, malignant pustule, pestilential bubo, &c.; diseases in which the inflammation, surrounding the gangrenous spot, seems to be rather the effect than the cause of the sphacelus. There are two varieties of gangrene of the lungs, which are strongly marked as well in their effects as in their anatomical characters. These are the uncircumscribed and the circumscribed.

1. *Uncircumscribed gangrene.*—This form of pulmonary gangrene may be reckoned among the rarest of organic affections. In the course of twenty-four years I have only met with it twice; and I know of only five or six cases of it that have occurred in the Parisian hospitals during the same space of time.* It presents the following characters: the pulmonary tissue, more humid and less cohesive than in the sound state, has the same degree of density as in the first stage of pneumonia, œdema of the lungs, or the serious engorgement occurring after death; its colour varies from a dirty white or slightly greenish hue, to a deep green approaching to black, with a mixture, occasionally, of brown, or of earthy or yellowish brown. These different shades are mixed irregularly in different parts of the lungs, in which we likewise observe some portions of a livid red colour, more humid than the rest, and seemingly infiltrated with very liquid blood, precisely as in the first stage of pneumonia. Some points here and there, are evidently softened and converted into a putrid *deliquim;* and from these, when cut into, there flows a turbid sanies of a greenish-grey colour, and of an insupportable gangrenous fetor.

The gangrenous affection occupies, at least, a great portion of one lobe, and occasionally the greatest part of one lung: it is never circumscribed. In some places the pulmonary substance, altogether or nearly sound, blends insensibly with the gangrenous parts; in other instances, these are separated by a portion of lung inflamed in the first degree; and, in still rarer instances, by a hepatized portion. If the disease is at all extensive, its progress is extremely rapid. The patient's strength is prostrate from the very beginning; the oppression becomes all at once extreme; the pulse is small, compressed, and very frequent; the cough is rather frequent than strong; the expectoration is diffluent, of a very peculiar green colour, and exhaling an extreme fetor precisely similar to that of a sphacelated limb.* This expectoration is pretty copious for a time, but soon ceases through loss of power, and the patient dies suffocated.

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* Dr. Carswell regards the frequency of this affection as considerably underrated by Laennec, and informs us, that he had himself seen twice the number of cases mentioned by Laennec, in the same hospitals, during a period of not more than three or four years. (Cyc. of Pract. Med. vol. iii., Art. *Mortification*, p. 124.)—*Transl.*

2. *Circumscribed* or *idiopathic gangrene.*—This differs from the preceding variety in occupying only a small part of the lungs, and in having no apparent tendency to affect the neighbouring parts. From this circumstance, its progress is much slower; insomuch that it has been ranged by Bayle (Recherches, p. 30) among the species of phthisis.

Anatomical characters.—This partial gangrene may occur in any part of the lungs. It exists in three different states, that of recent mortification or gangrenous eschar, that of deliquescent sphacelus, and that of an excavation produced by the softening and evacuation of the sphacelated spot. These gangrenous eschars are of irregular shape and of very variable size. Their colour is black verging towards green; their texture more humid, more compact and harder than that of the sound lungs; their general appearance extremely like that of the eschar produced on the skin by caustic; and their odour decidedly gangrenous. The portion of lung immediately surrounding them is inflamed and indurated either in the first or second degree. Sometimes in the progress of decomposition, the eschar detaches itself from the surrounding parts, like that produced by the cautery or caustic potass, forming a species of *core* of a blackish, greenish, brownish, or yellowish colour, of a filamentous texture, and more flaccid and drier than the recently-formed eschar. This core remains isolated in the middle of the cavity formed by the decomposition of the sphacelated portion. More commonly, however, the eschar becomes softened throughout, without leaving any distinct core, being converted into a kind of putrid paste, of a dirty greenish-grey colour, occasionally bloody, and horribly fetid. This matter soon makes its way into some of the neighbouring bronchi, and being thus gradually discharged, leaves an excavation of a truly ulcerous character. The pulmonary substance around the excavation, remains long inflamed in the first degree. After the lapse of several days, the most solid portions of the part thus affected have hardly attained the granular character; they are of a blackish-red, very humid, and contain very little air. When the eschar is separated, the walls of the excavation become the seat of a secondary inflammation, which seems still for a long time to retain something of the gangrenous character: the walls are invested by a false membrane of a greyish or dirty yellow colour, soft and opaque, which secretes a grumous pus of the same colour, or a black sanies, both of which retain the gangrenous fetor. If the eschar has been small, the false membrane may fill the whole space left by its solution, and may be eventually transformed into a solid cicatrix. Sometimes the false membrane is formed previously to the detachment of the eschar, and serves, in fact, to separate the living from the dead parts. Pretty often there is no false membrane at all, and the pus (of a sanious, grumous, blackish, greenish, greyish or reddish colour, and always more or less fetid,) is secreted immediately by the walls of the ulcer. These are formed of a tissue which is usually dense, and firmer and drier than that of the acute pneumonia. It creaks under the scalpel; is of a reddish brown colour verging on grey, or intermixed with shades of the last and dirty yellow; and exhibits the granular aspect on the incised surfaces. This state of engorgement, which evidently constitutes a chronic pneumonia, having little tendency to run into suppuration, does not commonly extend above half-an-inch or an inch from the excavation; occasionally, however, it extends to the whole lobe in which it is situated. At other times, the walls of the excavation are softish, fungous, and in such a state of putrid decomposition as to be easily destroyed by the touch of the scalpel. Pretty large blood vessels, naked and isolated, but still sound, sometimes traverse these excavations; at other times, the vessels are destroyed, and from their open mouths fill the cavity with coagulated blood.* These gangrenous excavations constitute the ulcerous phthisis of Bayle. Although he does not exactly describe their origin, the account which he gives of them and the cases he details, show that he suspected it. (Op. Cit. p. 30. obs. xxv—xxx.) Perhaps he was withdrawn from the mode of investigation which would have led him to their real origin, by the considerations, which (unreasonably in my opinion) led him to consider this as a species of phthisis. Sometimes the gangrenous eschar, in a state of decomposition, makes its way through the pleura, and excites a pleurisy, usually accompanied by pneumothorax, which latter appears to be the effect of the gas exhaled by the putrid eschar. At other times the gangrenous excavation opens at once into the pleura and bronchia; and from the latter is derived the air which constitutes the pneumo-thorax.

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* This kind of expectoration and the crepitous rhonchus, are the pathognomonic signs of this affection.—*Author.*

Physical Signs. These are almost the same as those of abscess of the lungs, except that the crepitous rhonchus is not so common as in the latter. This may be owing to the insidious nature of the disease, which does not lead us to examine the chest during the first days. I have been several times assured that the crepitous rhonchus did not exist until after the production of the eschar, thereby indicating the formation of the inflammatory circle which was to operate its detachment. Subsequently, the cavarnous rhonchus is perceived; and when the excavation begins to empty itself, pectoriloquy becomes distinct. When the eschar opens into the pleura, we have, further, the signs of pneumo-thorax combined with the liquid effusion; and, if it communicates also with the bronchi, the *metallic tinkling* or the *utricular resonance* becomes perceptible. The resonance of the voice in these excavations is much more distinct and strong than in the pulmonary abscess: it has nothing of that *floating* kind of sound of the latter, and is rarely accompanied by the *veiled puff* so common in the abscess. In the resolution of the pneumonia which succeeds the gangrene, as indeed in all kinds of chronic pneumonia, it is not easy to detect the crepitous rhonchus. In this affection the expectoration is so characteristic that all these signs would be quite insufficient without it. It is sometimes green, greenish, or brownish, or of a yellow ash grey verging on greenish,* more or less puriform, and with the gangrenous fetor. In the beginning of the disease it is frequently different. It has not then the peculiar fetor of gangrene, although it has a fetor almost as insupportable. Its colour is milk-white, and it is nearly opaque and of the consistence of mucilage. Gradually it assumes a greenish yellow, a brownish or ash-colour, and becomes sanious or purulent. When the disease becomes chronic, and particularly when it is in progress towards a cure, the sputa become yellow and acquire the consistence and odour of pus. From time to time, however, the gangrenous fetor re-appears. From the result of several cases of recovery, I am tempted to believe that the fetor and aspect of the expectoration above described, do not necessarily indicate the existence of a gangrenous eschar in the lungs, but that these characters may depend upon a general disposition to gangrene, manifesting itself especially in the mucous secretion of the bronchi. We might indeed suppose, in these cases, the existence of small eschars such as I have described in Case IV.; only that, in two or three dissections which I have made of such cases, I found nothing which could account for the gangrenous fetor, unless it were the rapidity with which the body generally, and the mucous membrane of the lungs more particularly, ran into putrefaction.

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* See a case of this kind recorded in M. Cruveilhier's *Anat. Pathol.* Liv. iii., in which the gangrenous excavation communicated with the sac of the pleura, and into which two pints of blood were extravasated.—(*M. L.*)

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* The reader will not have failed frequently to remark the singular, and, as it would seem, unnecessary minuteness of our author in his description of colours; a minuteness which is only to be paralleled by the precision of my most excellent and learned friend, Professor Jameson, in his mineralogical definitions. It is scarcely possible, however, to follow Laennec in some of his minutiæ; although I have done my best to translate them faithfully, even while doubting, sometimes, if I could recognize the subject of my own description if in bodily presence before me.—*Trans*

Symptoms and progress. The symptoms of the partial gangrene of the lungs are extremely variable, and differ greatly in the different periods of the disease. The invasion is usually characterised by symptoms of slight pneumonia; but this is attended by a degree of prostration of strength or anxiety, quite disproportioned to the severity of the local symptoms, and to the small extent of space over which the respiratory murmur and sound on percussion are wanting. In a short time the patient begins to expectorate sputa which are at first only disagreeable, but soon become of the gangrenous fetor. At the same time there are occasionally very severe pains in the chest, and likewise hæmoptysis more or less abundant; and the patient's complexion becomes pale, or rather wan and leaden. Very often the invasion of the disease is quite insidious; nothing but the general debility strikes the attention of the physician, and nothing seems to announce a severe affection of the chest. When the disease becomes chronic, there is a constant hectic fever, sometimes considerable, but usually less so than in most cases of phthisis; the skin is hot, and the expectoration and breath fetid. In this state, emaciation is very rapid, and the disease may readily be mistaken for phthisis; more commonly, however, death supervenes before the emaciation has made much progress, the disease appearing rather to have a tendency to produce cachexia than marasmus.

However dangerous this disease may be, we must not consider it as inevitably fatal. I have known several patients recover who had all the symptoms of it; and some of these, judging from the extent of the pectoriloquy, had gangrenous excavations of great size. In one case the eschar made its way into the pleura, determining a pleurisy, which lasted fifteen months. I here subjoin four cases of gangrene of the lungs; one of which was communicated to me by M. Cayol, and another has been extracted from the unpublished manuscripts of Bayle.

Case XII. *Superficial gangrenous eschar of the lungs giving rise to pleurisy.* A man, aged forty, after a fit of intoxication, was seized with head-ache, pains in the limbs, fever, and delirium, and was in this state admitted into the Necker Hospital on the 28th Nov. 1818. At this time he only complained of pain in the limbs. There was general fever, and at night there came on furious delirium, which was combated by the application of twelve leeches to the throat, ice to the head, and sinapisms to the thighs. The same state of general fever, delirium, &c. continued, with slight variations of symptoms and treatment, until he died, on the 11th December. Two days before his death it was remarked for the first time, that the respiration was somewhat impeded, and was found by the stethoscope to be less distinct on the right side. Percussion yielded an equal and middling sound on both sides.

Dissection twenty-four hours after death. The brain was in a natural state. There was some serum effused in the ventricles, at the base of the brain, and also under the pia mater. The right lung adhered anteriorly to the costal pleura by means of a recent false membrane, and its base was united to the diaphragm by a similar one. The middle portion of the lung was compressed towards the mediastinum by a pint and a half of a sero-purulent fluid, by which means the lung was reduced to nearly one half its natural size. It was every where sound, except that, on its inferior and posterior part, there existed a spot of the size of a large bean, of a greenish-black colour, and exhaling the decided gangrenous fetor. It looked like an eschar produced by the application of caustic potass, but it was humid and so soft as to be reduced into a putrid mass by scraping with the scalpel. It extended about six lines into the substance of the lung, which was hepatized to the distance of an inch around. The left lung and all the other viscera were sound.

CASE XIII. (By M. Cayol)—*Gangrene of the lungs.* A man, aged fifty-three, came into La Charité on the 16th June, 1811, having been ill six weeks. At this time the respiration was oppressed, and there was frequent cough with an expectoration of yellow, opaque, thickish sputa, having a gangrenous fetor, which was however still more offensively marked in the breath. The chest sounded well on percussion. From the beginning of his illness this man had experienced a daily increasing debility. He was not however much emaciated, but his flesh was soft and his complexion very wan. The same symptoms continued, with gradual increase, until his death, which took place on the 20th July.

Dissection ten hours after death. The thorax sounded well on the right side, and was preternaturally sonorous on the left, which circumstance made M. Bayle predict the existence of pneumo-thorax. This opinion was soon confirmed by the escape of a considerable quantity of extremely fetid gas through an opening made in one of the intercostal spaces. There were likewise on this side of the chest, two or three pints of blackish muddy serosity of a disgusting fetor. The lung was of a blackish colour, compressed towards the mediastinum, and reduced to one-fifth of its natural size. In its upper lobe there was an irregular excavation large enough to contain a duck's egg. The portion of lung in which this cavity was situated, was so thin exteriorily and so easily torn, that we doubted whether the cavity might not have been produced by the efforts used to destroy the adhesions. M. Bayle, however, thought that it had existed before death. This excavation was filled by the same liquid which occupied the pleura. It had no membranous lining of any kind, but its boundaries consisted of the naked pulmonary tissue, which was soft, friable, and blackish. There were many lesser cavities opening into this, all of which, as well as the principal, contained, besides pus, insulated masses of a soft putrid substance. That contained in the largest excavation was of the size of a walnut. These masses contained blackish filaments resembling pulmonary substance, and very like the gangrenous sloughs of cellular substance found in certain abscesses: they were, no doubt, eschars detached from the lungs. There were adhesions in various parts of this lung, and also recent false membrane lining a large portion of the costal pleura. On the right side of the chest there was a pint of reddish and limpid serum; but the lung on this side, and all the other viscera, were sound.

CASE XIV. (By M. Bayle)—*Partial gangrene of the lungs.* A man, aged forty-five, had been affected three months with coryza, and occasional fever, and had become considerably emaciated and unfit for labour, when he came into La Charité on the 15th Oct. 1811. At this period the patient complained only of stuffing of the nose, loss of appetite, and increasing debility. He had a slight cough, but without expectoration. He had never spit blood, had no pain of the chest, lay indifferently on either side, and had no other impediment in respiration but what seemed to arise from the nostrils. It being supposed that he had a polypus, he was transferred to the surgical wards, where he died two months afterwards, on the 20th Dec. During the time he was in the surgical wards, his cough increased, and latterly the respiration was much oppressed, and he had also a severe pain in the larynx, which induced M. Boyer to think he was affected with laryngeal pthisis.

Dissection. The larynx, trachea and bronchi were sound; as was also the right lung. The left lung was dense and of a livid red in its lower portion, being in a state of engorgement approaching to hepatization. In the lower part of the inferior lobe, a portion of the pulmonary substance was reduced to a sort of greyish putrid paste having the gangrenous fetor. This mass was quite continuous with the surrounding pulmonary substance, which was red and engorged, and with which this gangrenous spot contrasted both as to colour and consistence. There existed no cavity until after the removal of the gangrenous clot. This had no regular shape, nor was it accurately circumscribed: it was about the size of a large walnut. The rest of the lung was sound.

CASE XV. *Pleurisy and pneumo-thorax, consequent to the discharge of a gangrenous abscess of the lungs.* A man, aged forty-two, in good health until his twentieth year, after which he laboured under different complaints at different times—fever, severe head-ache, and, latterly, severe pains between the shoulders, for which he was repeatedly in the hospital—came to the Necker Hospital on the 30th of May, 1818. In April, his pains ceased after taking a quack medicine, but he was shortly after seized with loss of appetite, and cough, accompanied by a copious and extremely fetid expectoration. The following is the report of his symptoms on admission: moderate leanness, [illegible] brown, decubitus practicable on both sides, but easiest on the left; cough frequent, commonly in paroxysms, expectoration rather copious, yellow and opaque; respiration very good on the right side, much less perfect on the left, and attended by a mucous rhonchus; resonance on percussion somewhat less on the left side, both before and behind. State of the heart natural. From these premises the diagnosis was given—*Slight chronic pneumonia occupying the centre of the left lung.* The same state continued until the 7th June. At this time the respiration was still good on the right side; but on the left it was only perceptible at the roots and in the upper lobe;—in the latter place it was more distinct than before, in the former it was much less distinct. The sound on percussion on this side was also less than when the patient came into the hospital. From these symptoms I made the following addition to the diagnosis:—*the pneumonia begins to disperse at the roots of the lungs, but there has supervened pleurisy, with sero-purulent effusion in the left side.* On the 12th, respiration was just perceptible under the left clavicle; on the 16th, it was hardly perceptible over the whole of the upper half of this side anteriorly; but the sound on percussion was now particularly clear over the same space. I therefore subjoined to my diagnosis—*pneumo-thorax.* On the 17th, the pain, which had been absent since April, re-appeared between the fifth and sixth ribs; the other symptoms continued nearly the same. On the 3rd July, percussion elicited a good sound from both sides of the chest anteriorly and laterally. The sound of respiration was good on the right, but was entirely wanting on the left, both before and behind, except at the roots of the lungs and perhaps a little below the clavicle. The pain in the back was more severe; the cough was also more violent, and during a severe fit of this he felt an acute pain in the left side, and immediately expectorated about half-a-pint of yellow, opaque, somewhat ropy and purulent sputa; the discharge of which seemed at once to relieve and weaken the patient. The expectoration continued copious for some time. During several examinations the state of the chest continued nearly the same, except that respiration was very slightly audible below the left clavicle, and the left back yielded a duller sound on percussion. The patient died on the 31st July.

Dissection twenty-four hours after death. On perforating with the scalpel the left chest, a considerable quantity of gas having the fetor of gangrene, made its escape. The left lung was compressed towards the spine and mediastinum, but was united at its anterior edge to the cartilages of the ribs, and also to the mediastinum and back part of the ribs, by means of a membrane. One-half of the space comprised between the lung and ribs was empty, and the other half full of a yellowish semi-transparent liquid, purulent at bottom. The base of the lung adhered every where to the diaphragm, except over a small space near its anterior edge. In this point there was a perforation, with lacerated blackish borders, which would have admitted a large goose-quill. The black colour extended around the opening to the distance of two or three lines, marking out a speck, which, from its want of cohesion, its odour, and its exact circumscription, had all the characters of a gangrenous eschar. The perforation extended from four to six lines into the substance of the lung, and then terminated in an excavation capable of containing a large walnut. The walls of this cavity were anfractuous, and lined by a false membrane of a greyish-white, smeared with an ash-coloured pus. It was evidently the source of the gangrenous fetor perceived on opening the chest, as it exhaled this odour in a much greater degree. Several bronchial tubes opened into it. The substance of the lung was flabby, *fleshy*, and contained little blood; it was firmer, almost *hepatic*, to the distance of half an inch around the excavation; the bronchi in the vicinity of this were greatly dilatated: several of them, naturally of the size of a crow-quill, being enlarged to the diameter of a small goose-quill: their lining membrane was red, and covered with a sanious, frothy and puriform mucus. The right lung and the other viscera were healthy.

Besides the idiopathic kind just described, there exists another species of circumscribed gangrene of the lungs, that, namely, which occasionally occurs in the walls of a tuberculous excavation. This is an extremely rare affection, being, at least, ten times less common than the idiopathic gangrene. The affection is, however, analogous to others which are very common; I mean those superficial sloughings which take place in cancers of the uterus, stomach, or even of the mamma. When a tuberculous excavation becomes affected in this manner, its walls, to the depth of one or two lines, are converted into a soft, humid eschar, of a greyish, brownish, greenish or blackish colour. In this slough we cannot distinguish the grey induration which usually surrounds a tuberculous cavity, but we may perceive any crude tubercles that may happen to be there, only discoloured with the matter of the eschar. This becomes soft and is gradually expectorated; but, as in the case of the idiopathic gangrene of the lungs, the walls of the excavation continue for a long time, after the total destruction of the slough, to secrete a greyish sanious pus of a decidedly gangrenous fetor. This peculiar odour, together with the greenish or greyish colour of the expectoration, and the extreme prostration of the strength, is the characteristic sign of this species of pulmonary gangrene, as well as of the preceding. These two kinds, however, might be readily distinguished, if we had an opportunity of watching the progress of the disease and had recognized the existence of pectoriloquy previously to the appearance of the gangrenous symptoms.*

SECT. IV.—*Of chronic pneumonia.*

Is there really such a disease as chronic pneumonia? This question will only appear singular to those who are practically unacquainted with pathological anatomy. And the fact certainly is, that data for its right determination can be supplied neither by ancient nor modern writers. If we consider the question *a priori*, it seems hardly probable that an organ so vascular, so mobile, and so essential to life as the lungs, can remain long in such a state of slow and inactive inflammation, as we know to be frequently the condition of organs less necessary to life. Accordingly, we find that those excellent observers of nature, the Greeks, have made no mention of chronic pneumonia; and the term is hardly to be met with in the schools of more modern times, although it must be confessed that these have been too much in the habit of delineating diseases after a preconceived theory. If any physicians of the present day in Paris, still make use of this phraseology, they apply it, in imitation of schools the most ignorant of pathology, to pthisis pulmonalis, which they affect to consider as one of the terminations of pneumonia. This is the opinion of M. Broussais, (Doct. Med. t. ii. *passim*,) who even appears to consider it as novel: we shall hereafter find how groundless it is.

I am acquainted with only a small number of cases which can be considered as examples of chronic pneumonia; and they are extremely rare. As I have stated in the preceding section, I have occasionally found the pulmonary substance around a gangrenous excavation, much harder than in simple hepatization, and *creaking* under the scalpel. The incised surfaces in this case have the granular appearance more marked than in the acute pneumonia. This appearance is still more distinct when we *tear* the morbid part; the granulations being more obvious, much firmer and drier, and very much like the eggs of certain insects, which are closely pressed together without any intermediate substance. The cut surfaces have the various colouring which is observed in the acute hepatization; but the violet grey and the livid red are the predominating hues. We can distinguish very few points of yellow; but sometimes we observe a distinct greenish shade, the result of the gangrene previously existing in the vicinity. The diseased parts are hardly at all humid, and even yield scarcely any kind of fluid when scraped by the scalpel.[*] I have noticed a similar condition of parts after an hæmoptysis, which has been succeeded by a slight pneumonia of several weeks' duration. We at times observe something of the same kind, but very rarely and indistinctly, around large tuberculous excavations, and in the small interspaces in cases of numerous tubercles; but in both these examples it is much more common to find the remarks of an acute hepatization, which had occurred only a few hours before death. In instances of this sort, we must be careful not to confound the condition of parts described, with the grey tuberculous induration, common in lungs filled with tubercles, and which is only one of the forms of these accidental productions: the tuberculous induration is semi-transparent, vitriform, and humid, and the incised surfaces are smooth and homogeneous.

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* In the work formerly quoted (*Anat. Path.* liv. iii.) M. Cruveilhier gives a case which he considers as an example of *dry and non-fetid gangrene* of the lung. In this case the left upper lobe was converted into a vast excavation communicating with the pleura, yet still containing *a white and odourless pus*, and in this there was a detached fragment of pulmonary tissue. The patient had lived thirty-five days after the invasion of the disease; the chief symptoms were severe dyspnœa and repeated hæmoptysis; and the matter expectorated was, by turns, mucous, puriform, sanguineous, reddish, *and without fetor*. From the symptoms and appearances after death, I am disposed to refer this remarkable excavation to the softening and separation of an *apoplectic mass*.—(*M. L.*)

We may also term those cases *chronic*, in which the pneumonia, although originally acute, has been checked in its progress by blood-letting or other antiphlogistic means, but in which these antiphlogistic means have been insufficient to procure speedy resolution, or even to prevent relapses. I have known instances of this kind continue two months in the stage of engorgement, and finally terminate in simple œdema before being cured. In other examples, in addition to the engorgement, there existed some spots in the state of hepatization. I have even known abscess of the lungs occur in this chronic stage of the disease. Cases of this kind seldom prove fatal; but in the small number in which I have been able to examine the body after death, I have found different parts of the lungs, here and there, of a firmer consistence, and drier than in the acute hepatization, but in other respects quite similar. In the intervals of these portions, the pulmonary substance was loaded with serosity containing small specks of pus, rather suspended than dissolved, and which, as well as the yellowish hue of the lungs, seemed to me to point out the resolution of a case of pneumonia which had reached the stage of suppuration.[†]

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[*] This statement appears to me incorrect. The indurated pulmonary tissue which surrounds gangrenous masses, far from being dry, is usually so humid as to be œdematous.—(*M. L.*)

[†] The statements contained in this section will, no doubt, appear singular to many English readers; and I confess, that if I felt justified in placing the dissections made in this country (including my own) on the same level, as to minuteness and accuracy, as those made by the French pathologists, I should feel disposed to question the truth of these statements. But as every candid person must admit that the hurried manner in which dead bodies are commonly examined in this country (or used to be

SECT. V.—*Of latent and symptomatic pneumonia.*

When we consider the importance of the organ affected, and the serious mischief produced by the disorder of its functions, we might suppose pneumonia to be one of those diseases which could with the greatest difficulty escape detection. Nevertheless, we have already shown, that the severest instances of simple inflammation of the lungs, are sometimes recognized with difficulty during the first days of the attack; but it is when complicated with another disease, that pneumonia most easily escapes the

so, at least) renders mistakes extremely probable; and as we must likewise confess that our means of observation, and consequently our experience, fall vastly short of theirs, it is perhaps no great stretch of candour to be willing to receive the authority of such men as Laennec, Chomel, Andral, and Louis, in preference not only to many of our recorded cases, but even to our own hurried observation. The correctness of our author's statement respecting the great infrequency of pneumonia in a chronic form, is supported by the concurring testimony of the most experienced pathologists of the present French school. Andral says, that of one hundred and twelve cases observed by him, only one lasted more than thirty days; and that during the five years which he had been at *La Charité*, he had met with very few examples of hepatization or purulent infiltration, in cases of more than two months' standing. (Med. Clin. t. ii. p. 365.) M. Chomel states, (Dict. de Med. t. xvii. p. 252,) that in the course of the last sixteen years, during which he has examined, on an average, two hundred dead bodies annually, he has only met with two well-marked cases of this affection. Andral notices it as existing under two forms, the *grey* and *red induration*, and describes it briefly as being dry and hard, of a pale red or greyish. (Op. Cit. p. 310.) Chomel describes the lesion in the two cases met with by him, as consisting of a grey dense induration, without granulations, much drier and harder than hepatization, and occupying a fourth or fifth part of one lung. The same condition of lung is, I think, described by Corvisart, in his Commentary on Avenbrugger, p. [illegible], and by Avenbrugger himself, p. 262, and appears to be that found by myself in the case of chronic pleurisy, detailed in "Original Cases," p. 247. M. Andral likewise considers that black induration of the lungs, sometimes existing around tubercular excavations, and which Laennec describes as a particular degeneration under the name of *melanosis*, as being frequently the result of chronic inflammation. (Op. Cit. iii. p. 230.) In the small work above mentioned, I have entitled several observations "chronic pneumonia;" and I certainly have been in the habit of considering many cases I met in practice as examples of this disease. I am willing to admit, however, that I have been sometimes mistaken, and, both in practice and in my dissections, have confounded different affections under this name.

The truth seems to be, that inflammation of the pulmonary substance, strictly and essentially chronic, (like the chronic affection of the serous membranes,) is extremely rare; but that, as a sequel of the acute disease imperfectly resolved, or as complicating other organic lesions of the lungs, it is by no means uncommon. Our author himself admits that the acute disease, made chronic by treatment, may last two months; and Lorinser says that this period may be doubled. Both M. Andral and M. Chomel, however, are of opinion that chronic inflammation of the pulmonary substance is very common under another name and form. They consider the thin layer of grey substance which is found surrounding softened tubercles (and which Laennec regards as simply tuberculous) to be the product of chronic inflammation. In this opinion they are joined by Louis (Recherches, p. 9.) For further observations on this subject, see the chapter on phthisis in the present work.

Chronic pneumonia is not indicated by any peculiar physical signs, presenting those only of obstruction or induration of more or less of the pulmonary tissue, viz. dulness on percussion, absence of the respiratory murmur, and the development of bronchophony and bronchial respiration.—*Transl.*

notice of the practitioner. I shall, therefore, proceed to point out the complications which are most common, and most likely to mislead. I will not, however, notice, in this place, the combination with pleurisy, as that will form the subject of a distinct section. We have already seen that pneumonia is sometimes conjoined with hæmoptysis: it still more frequently supervenes to œdema of the lungs. The sero-sanguineous congestion of the lungs, which takes place in almost all dying persons, is frequently converted into pneumonia, if the agony is at all protracted. On examination after death, different points of the lungs are found distinctly hepatized, more particularly during the prevalence of an inflammatory constitution.[*] This species, which I term *pneumonia of the dying*, is commonly accompanied with a very strong and suffocating tracheal rhonchus; but the presence of the rhonchus does not always indicate the existence of this disease. This rhonchus, when extremely strong, is unquestionably the thing most apt to mask the crepitous rhonchus of incipient pneumonia. Andral encountered this difficulty, and would seem to consider it as insurmountable (Op. Cit. p. 235, &c.); but I am of opinion that attention and experience will always enable us to distinguish the crepitous, amid the loudest mucous rhonchi. I have never experienced any difficulty in this respect, except where the case was rather the cessation of life than a formal disease, or where the engorged portion of lung was very small.—Pneumonia is occasionally combined with the different varieties of catarrh, but more rarely perhaps than with any other disease of the chest. It is by no means common to find the acute catarrh terminate in pneumonia; and in the instances of epidemic pneumonia, persons affected with chronic mucous or pituitous catarrhs, are perhaps less liable to be attacked than those who are in perfect health. The rule is, however, not without exceptions. The suffocative catarrh, particularly when it attacks young persons or adults, is often complicated with pneumonia; and we meet with individuals habitually subject to chronic catarrh commonly dry, (but becoming occasionally mucous,) who are extremely liable to be attacked by this disease, from the slightest causes, and who have two or three seizures in the course of the year.—Phthisical subjects are liable to attacks of pneumonia, usually of small extent, and the symptoms of which are, therefore, very readily confounded with those of the primary disease. On this account, if for no other reason, it is important to explore, from time to time, the chest of consumptive patients, more particularly when there is any increase of fever, or any sudden decrease of strength.*—Several diseases which may be considered of a general kind, have a singular tendency to be complicated with pneumonia, or to excite this affection sympathetically. It is thus found occasionally to supervene to an attack of gout or rheumatism. If the pains of the limbs cease on its attack, it is usually recognized, or at least suspected, from obvious symptoms; but if the pains continue, the pulmonary affection remains latent, or is only discovered by means of an attentive exploration. The eruptive fevers are sometimes combined with pneumonia. Measles, in particular, frequently present this union, at the period of the disappearance of the eruption. In this case the pneumonic affection is pretty frequently manifest; but when it supervenes in the course of confluent small-pox, or severe erysipelas, it is almost always latent. The same is true of the pneumonia which arises in the course of violent continued fevers. Nothing is more common than this last-named complication, especially in winter and during the prevalence of pneumonia; and in these cases, its invasion is seldom indicated by any unusual dyspnœa or expectoration, or, in short, by any of the ordinary symptoms of inflammation of the lungs. It is true that it only occurs towards the fatal termination of the disease; but probably it is also very often the cause of this. In the young and robust, the invasion of the pneumonia may sometimes be suspected from a marked increase of fever taking place. But in old persons, and in subjects weakened by the long continuance of high fever and low diet, it comes on all at once, attended by a sudden prostration of strength and loss of consciousness. The skin becomes harsh, the excretions fetid, the teeth and tongue covered with a fuliginous coating, and coma or the tracheal rhonchus announces the approach of death. These latter symptoms frequently indicate the supervention of pneumonia in subjects worn out by severe chronic disease, especially cancer. We ought to range among sympathetic pneumonia that which constitutes the predominant symptom in the pernicious fevers denominated pneumonic. The morbid anatomy of this affection is yet very imperfectly known, from the circumstance of its proving rarely fatal; as we fortunately possess in cinchona, when administered in time, a certain means of cure

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[*] Louis states (Recherches, p. 39) that out of one hundred and twelve subjects, who died of various chronic diseases, he found the lungs partially inflamed in the first degree (engorged) in ten, and in the second degree (hepatized) in twelve. In all these cases he says that it was evident the inflammation had supervened only a few days before death.—*Transl.*

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* Andral describes the intercurrent pneumonia of phthisical subjects as being very common, and as often occasioning death, from being overlooked. In the acute form it is remarkable for its frequent occurrence in the same subject, it being by no means uncommon to find the same patient affected with it twelve or fifteen times. (Cl. M. ii. 225.) Louis (Rech. p. 241) while he admits the occurrence of this complication with phthisis in the early stages, (when it is most commonly cured,) notices it chiefly as supervening towards the very last days of the disease. At this time it is very frequent, yet, he says, not more so than in other persons dying of chronic affections; (see the preceding note;) so that he conceives himself justified in stating that phthisis in its latter stages, has no particular influence in exciting pneumonia.—*Transl.*

We have some facts, however, which prove that traces of pneumonia have been found in subjects dead of this disease; I have myself, in two accessions of this fever, witnessed the presence of the glutinous sputa, and a very intense crepitous rhonchus.*

SECT. VI. – *Treatment of pneumonia.*

Pneumonia, in common with the whole class of inflammatory affections, seem to be one of those diseases in which the indications of treatment are the most obvious. And yet if we seek to establish this on any particular theory, we shall find that the most opposite measures have, in their turn, been held up to exclusive commendation. On this account I shall here content myself with giving an exposition of the results of observation relative to the chief methods of treatment hitherto proposed.

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* A very important variety of pulmonic inflammation, important no less from the causes which give occasion to it than from its peculiar characters, has been lately introduced to the notice of the profession by some of our distinguished surgical pathologists: I allude to that which supervenes to wounds and the larger operations, and which is, I fear, too often latent. See Guthrie's Treatise on Gunshot Wounds, (first published in 1815,) 2nd Ed. p. 284; and C. Bell's Surgical Observations, Part iii. p. 241. Lond. 1817. From the statements made by these authors, it appears that pneumonia is a very frequent cause of death in the cases in question; and that it comes on in the most insidious manner, scarcely giving warning of its presence, certainly not of its violence, until too late for beneficial treatment. In these cases I would strongly recommend the stethoscope to the surgical practitioner, as a sure, and almost exclusive, means of acquiring an exact knowledge of the progress of the disease. From the account given of it by M. Guthrie and Sir C. Bell, it appears evident to me, that had this instrument been applied on the first appearance of the dyspnœa, the crepitous rhonchus would have immediately pointed out the presence of the inflammation, of which the general symptoms gave little or no indication, and might have thereby been the means of checking its fatal progress by suggesting the proper remedies. At the same time that I state this, I am not ignorant that cases occur (though very rarely) so completely latent as not only to be unaccompanied by dyspnœa, cough, or expectoration, but even to yield no results from percussion or auscultation. (See Andral, t. ii. p. 369.) The reason of the lungs becoming affected in the class of cases just noticed, is an interesting subject of inquiry, but one on which I cannot here enter. It is, however, very doubtful if many of the purulent depositions found in the lungs after operations and certain diseases which give rise to unhealthy inflammation and phlebitis, are, in reality, the consequence of any preceding phlogosis of the pulmonary tissue. They would certainly seem, in some cases, to be rather the result of a metastasis or transposition of pus from a remote part.

Cases of latent pneumonia had not escaped the notice of that most excellent writer J. P. Frank. "Est tamen (he says) ubi in thoracis cavo *occulta* viscerum *inflammatio* latuit; cui signa, cum viveret ægrotans, defuere quidem; sed ubi dira inflammatio, vel facta jam pulmonis suppuratio, post mortem demum in conspectum venerunt. Eadem in pluribus accidisse *vaccis* observavimus, quas, cum epidemica summeque lethalis has bestias prosequeretur peripneumonia; vel cum saniores apparerent, experimenti causa mactatas, cum duro ac inflammato pulmone secuimus." De Cur. Hom. Morb. lib. ii. p. 135. For some account of this disease among cattle by Lorinser, see his *Lungenkrankheiten*, p. 212, and also, Bojanus's "*Anleitung zur kenntniss und behandlung der wichtigsten seuchen unter den Hausthieren*. Berlin, 1820, p. 165. Lorinser states that in these cases, the lungs are found heptaized, to a greater or less extent; and upon comparing the size and weight of the diseased and healthy organ, he is convinced that the lungs are (as Broussais maintains) actually enlarged in pneumonia. He says, that he found the diseased lungs weighing from twenty-five to thirty pounds, being an increase of from twenty-two to twenty-seven pounds above the weight of the sound viscus. For some valuable observations on symptomatic affections of the lungs, and other organs in surgical cases, I refer to a recent paper by Mr. Rose in the 14th vol. of the Med. Chir. Trans.—*Transl.*

Bloodletting. From the time of Hippocrates to the present day, most medical men have regarded pneumonia as one of the diseases in which bloodletting is productive of the most striking benefit. To this general truth all good practitioners have admitted only a few general exceptions; and it has only been by some few theorists and medical heretics that its employment has been proscribed. The same uniformity of opinion, however, has not existed respecting the quantity of blood to be drawn at one time, the period of the disease when bloodletting ceases to be useful, and the part of the body where it ought to be performed. The greater number of the ancient physicians bled only at the onset of the disease, and allowed the blood to flow until syncope took place. This practice was sometimes followed even by Galen. It was much used in the century before the last. It is still very common in England; many of the physicians of that country, in the commencement of pneumonia, directing the detraction of twenty-four, thirty, or thirty-six ounces of blood. This practice is not to be found fault with;* since it is certain that a copious bleeding in the beginning of the disease, reduces the inflammatory orgasm much more speedily, than repeated smaller venesections will do at a later period, and, moreover, leaves less chance of a renewal of the inflammation. The ancients considered bleeding as a questionable remedy after the first days of the disease, fearing thereby to check the expectoration; and the best practitioners of the two last centuries forbad this operation after the fifth day, if the discharge was mucous and abundant. Apprehensions of this kind are not perhaps unreasonable, if the loss of blood is carried to syncope; but we know from experience, that in a lesser degree, though still pretty copious, bloodletting may be had recourse to with much advantage, in a very advanced period of pneumonia, even when this has reached the suppurative stage and is attended with a great expectoration.*

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* After the matter of fact statement in the latter part of this sentence, it is no wonder that our author goes the length of admitting that the English practice of bleeding largely in the beginning of pneumonia "is not to be found fault with." But it is truly wonderful that after such a statement, he does not recommend the practice in preference to that commonly followed by most continental practitioners, and which is detailed in the next page. To the readers of this work it is unnecessary to say, that the quantity of blood mentioned in the text may be detracted twice or even thrice within the period of twenty-four hours, in the beginning of the disease, not only with safety, but unquestionable benefit,—due consideration being had to the severity of the attack, the constitution of the patient, and the character of the prevailing epidemic. It is only in the more advanced stages of the disease, that greater caution is necessary in the detraction of blood; and it is the prosecution of the same vigorous treatment at this latter period, too common in this country, that is justly obnoxious to the criticism of foreign practitioners. In such circumstances there can be no doubt that the small bleedings and copious leechings used abroad are vastly preferable; or even the expectant system, with its starvation and its innoxious ptisans. The system of medical practice in this country is perhaps too generally chargeable with the imputation of over activity; the *medicina perturbatrix* is too exclusively cultivated, especially by the younger members of the profession. Poor nature with her *vis medicatrix* is so scorned and outraged, in what, after all, is truly her own dominion, that it is no wonder if the acts of such radical reformers of her plans are sometimes turned to their own confusion. I believe, however, that the unlimited intercourse now happily existing among the nations of Europe, is gradually improving the medical practice of each individual country. This is obvious in respect to bloodletting in pneumonia. M. Andral in his late work says, that the first bleeding should be from sixteen to twenty ounces, and that the operation may be repeated twice or even thrice within the first twenty-four hours. (Op. Cit. tom. i. p. 379.) M. Chomel also, in his article on pneumonia in the *Dict. de Med.* (tom. xvii. p. 243,) says, that the first bleedings should be from twelve to sixteen ounces, and that one may be repeated a few hours after another, to the third time on the same day. In a recent journal, (*La Clinique*, tom. i. No. 20,) bleedings of from two to three pounds repeated every twelve hours, are strongly recommended by M. Renauldin. For some excellent remarks on the propriety of instituting one ve-

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copious bleeding, in the early stage of pneumonia, I refer the reader to a paper by Dr. Robertson in the Edin. Journ. vol. x. p. 192. The aphorism of Dr. Gregory there quoted—"the danger of a large bleeding is less than the danger of the disease"—is excellent; and it were well if it were more frequently in the recollection of practitioners, in the beginning of inflammatory diseases. Without at all sanctioning the practice therein detailed, I would also refer the reader to a singular document in the same journal (vol. xiii. p. 165) for proofs of the astonishing extent to which bloodletting may be carried with safety at least, if not with benefit. The writer, Mr. Comrie, states, that his practice (the disease was the ardent fever of the West Indies, the patients seamen) was, to take away fifty, sixty, or seventy ounces of blood at the first bleeding; and that his patients sometimes lost one hundred ounces within the first twelve hours, and upwards of two hundred and fifty ounces in the course of three or four days! I once knew a man bled to eighty-four ounces at one bleeding, in an attack of fever, without suffering syncope, or any ill effect except great disorder of the circulation for some hours afterwards.

In the following short sentence of a celebrated author, we have at once the very best practice inculcated, and the very best reasons given for its being strenuously enforced. Speaking of the treatment of pneumonia, Diermerbroek says—"Vena igitur quam citissime in brachio secanda, et sanguis liberaliter extrahendus; eaque venæsectio, si prima vice non imminuitur morbus, postea bis terve reiteranda; qua licet vires aliquando dejiciantur, et tamen de causa nihil metuendum, quippe præstat ægrum debilem sanari, quam fortem mori." Disput. Pract. de Morb. Capitis, Thoracis, &c. p. 56. The pithy remark in the conclusion of this sentence, coupled with the kindred one of Dr. Gregory, ought to be frequently suggested to the timid practitioner.—*Transl.*

* This opinion of our author is supported by almost all our great authorities, and among others by Stoll, Cullen, Frank, &c. The contrary doctrine, however, has the sanction of many most respectable names, as of Pringle, &c. Andral joins with Laennec in stating that bleeding is positively beneficial not only in the stage of hepatization, but even in that of suppuration. To the testimony of facts we can oppose no equivalent objection; although, considering the very limited powers of art in removing great alterations of structure, it might be reasonably conceived *a priori*, that a hepatized lung was not likely to be much under the influence of venesection. This much, at least, I am justified in stating from my own experience, that the vastly inferior power of bleeding in the second and third stage of pneumonia, ought to make us depend principally upon what we can effect in the first stage. And as guiding our practice in this most important particular, I consider the stethoscope as of the utmost consequence; for without it who shall say positively that the disease is in its first or its second stage? On this point of practice, the opinion of Lorinser is strongly against bleeding in the latter stages. He says, that after hepatization has taken place, bleeding, by weakening the powers of the system, impedes or altogether prevents the absorption of the effused lymph; and that while one or two venesections in the first stage often suffice to produce complete resolution, six or even ten in the latter stage will not only have no good effect, but will decidedly hasten the fatal

The practice most commonly followed at present, over the whole of Europe, is, in the beginning of the disease, to bleed to the extent of from eight to sixteen ounces, and to repeat the operation daily, and sometimes even twice a day, if the inflammatory symptoms do not give way, or if, after being subdued for a few hours, they return with fresh violence. After the first five or six days, the bleedings are repeated after longer intervals, and soon cease altogether, except in cases where they are strongly indicated by the renewed strength of the pulse, oppression and fever.* Much importance was formerly attached to the particular vein to be opened, the preference being given to that of the affected side. At present this is almost universally acknowledged to be a matter of complete indifference.

There are some cases in which bloodletting is clearly contraindicated, or, at least, in which it can only be used very sparingly, and once or twice at most. Of this kind is the pneumonia which attacks old persons of a cachectic habit, and that which supervenes to diseases which exhibit obvious signs of a septic state of the fluids, such as the violent continued fevers called putrid or adynamic, and scurvy. In certain epidemics, which have occurred among persons previously subjected to the influence of depressing causes, bleeding has been found uniformly injurious. I was myself witness of an instance of this kind among the conscripts of the French army in 1814. In the pneumonia then prevalent, I very seldom found bloodletting indicated, and the small number who were bled bore the operation so ill that I did not venture to repeat it. In gangrenous pneu-

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event. He adds, that he has repeatedly proved the truth of this doctrine in the epidemic pneumonia of cattle (*Lungenseuche der Rinder*) in which he invariably found bloodletting if not injurious, at least useless, after the disease had reached the stage of hepatization, (*Die Lehre von den Lungenkrankheiten*, p. 259.)—*Transl.*

* It would appear from the writings of the modern Italian physicians, that bleeding in pneumonia is carried to a greater extent in Italy than our author seems to be aware of. Among others, see the very sensible work entitled "*Annotationi di Medicina Pratica del dottore F. Enrico Acerbi.*" Milano, 1819. This author states (*Anno primo*, p. 24.) that of one hundred and forty-two cases of pneumonia treated by him, more than thirty were bled from ten to twenty times, each bleeding being twelve ounces; and that the usual practice was to bleed night and morning, so that in the course of eight or ten days from fifteen to twenty pounds of blood were taken away.

It is singular that our author takes no notice of the local abstraction of blood by leeches or cupping, so important an auxiliary to the lancet in all inflammatory diseases, and so much used, especially in his own country, in this very disease. It appears from Andral's work (t. ii. p. 379) that M. Lerminier is in the habit of using venesection and leeches simultaneously. Immediately after V. S. or even while the blood is flowing, "M. L. fait souvent couvrir de sangsues le coté douloureux." It is a good general rule to apply a large number of leeches (from twenty to forty) to the part most affected, an hour or two after the first V. S.; to allow them not to remain on the body more than a quarter of an hour or twenty minutes, and when they are removed, to envelope the whole side in a large soft warm poultice. This practice is still more indicated when there exists any pleuritic complication. It need hardly be stated that the local bleeding must not supersede the use of the V. S. if indicated.—*Transl.*

monia, one bleeding may be useful at first, if the patient is strong and plethoric and the inflammatory symptoms well marked; but we must be careful not to augment the septic tendency by carrying depletion too far. The same remark applies to the remittent fevers denominated *pernicious peripneumonic.* In these, it may, no doubt, be sometimes necessary to bleed during a paroxysm, in order to prevent suffocation; but the utmost caution is requisite not to destroy unnecessarily the strength of the patient. We must ever keep in mind, in this case, that bloodletting cannot *cure* a disease which will certainly return after a few hours with fresh violence; and of which experience has long since demonstrated bark to be the only effectual remedy.* I have had occasion to observe some cases of *pernicious fever*, existing under the mask of different inflammatory affections, which were treated by bleedings too frequently repeated, and by cinchona given in too small doses, or left off too soon. These fevers were only imperfectly cured, and left behind them various lesions, which, in some cases, ended fatally, and, in others, tormented the patients for several years. The same result was observed in cases where no blood was drawn, but in which the bark was administered in too small quantity, or for too short a time: an instance of this will be noticed in the chapter on pneumo-thorax. When pneumonia is complicated with a bilious affection, bleeding must, in like manner, be much more sparingly had recourse to, than when the inflammation is simple. In all these cases, and indeed in every case whatsoever, the more feeble the pulse is, the less indication is there for venesection. At the same time, it is well known to every practitioner that this feebleness is sometimes only apparent, and that bleeding will render the pulse both stronger and fuller. To discriminate the false from the real feebleness of pulse, requires the tact of an experienced practitioner; and, unfortunately, the most expert are in this often deceived. In cases of this kind, the use of the stethoscope will tend greatly to remove our doubts, as will be seen when we come to treat of the exploration of the heart's action. At present I shall only observe, that whenever the pulsations of the heart are (proportionally) much stronger than those of the arteries, we may bleed without fear, and with the certainty of finding the pulse rise; but that if the heart and pulse are both weak, the detraction of blood will almost always occasion complete prostration of strength.* I have, nevertheless, observed in some cases, but very rarely, that a small bleeding, even in such circumstances, has succeeded in restoring the energy of the circulation; and this has been when the debility depended on cerebral congestion.

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* For some excellent remarks on the relation which exists between the febrile state (strictly so called) in intermittent fevers, and the local inflammations with which these are so generally complicated, I beg leave to refer the reader to the valuable though too hypothetical work of M. Bailly, entitled *Traité des Fièvres intermittentes simples et pernicieuses.* Paris, 1825. In this work, the result of extensive clinical and pathological observation among the pernicious fevers of Rome, the absolute necessity of administering the bark in order to check the progress of the fever, even in cases complicated with the greatest visceral inflammations, is clearly demonstrated. See particularly p. 265, et seq. See also the works of Morton, Torti, Quarin, &c.—*Transl.*

Derivatives.—Most physicians consider blisters as being, after venesection, the most efficacious remedy in pneumonia. Some are accustomed to apply them to the chest immediately after the first bleeding. Others, from an apprehension of increasing the local congestion, have recourse to them only at a later period, or apply them to the extremities. In my own practice, I rarely apply blisters to the chest, particularly in the acute stage of the disease, from having very rarely observed any good effects from them. And, indeed, it may be stated as generally true, that blisters, sinapisms, dry cupping, and other cutaneous excitants, are of too feeble operation to displace so energetic an irritation as that which exists in acute pneumonia. Too often they increase the fever, and consequently the congestion in the chest. And this latter effect is still more probable if they are applied to the thorax; in which situation they are further injurious by impeding the action of the muscles of inspiration. For these various reasons, I am of opinion, that the use of blisters and other similar applications, ought to be restricted to those cases, in which after the acute stage, resolution proceeds too slowly, and to the disease in a chronic state; and that on all occasions, we should, if possible, avoid applying them to the most moveable parts of the chest, viz the middle of the ribs.†

Alcalis and attenuants (Fondans.)—The method by which the ancients proposed to themselves to render the blood less plastic, consists, as we have already stated, in the use of alcalis more or less neutralized, particularly the subcarbonates of potass, soda, or ammonia; soap; the neutral purgative salts, such as the sulphates of soda, potass, &c. given in doses too small to have a cathartic effect. To these has been added, during the last century, Virginian snake-root, from its supposed efficacy in curing the bite of the rattle-snake, which is occasionally found to cause pneumonia. This medicine has been much used by the Italian physicians, particularly Sarcone; but both it and the others above mentioned, have appeared to me of little use in the treatment of pneunomia. They favour expectoration: but their action is too slow and feeble to obtain for them much of our confidence as means of arresting a disease so rapid in its progress. They have more effect when the disease has assumed a chronic form. These means are rarely used as expectorants; most practitioners preferring, with this view, antimonials or squills, and these only towards the termination of the disease: during the acute stage, diluent and mucilaginous drinks are employed.[*]

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* I need not point out to the reader the high practical importance of this observation. I am sorry to say that I have only proved its correctness in a small number of cases, from having failed to institute the necessary explorations. To derive from the stethoscope all the benefits which it is capable of affording, it ought to be used almost as frequently as the watch.—*Transl.*

† Blisters are in general indicated in pneumonia by the exhaustion of the patient, the weakness of the pulse, and the increase of dyspnœa subsequently to the first general bloodletting. Good practitioners never apply them, in the first instance, to the chest, but to the legs, thighs, or inside of the arms. When they fail to act as derivatives, blisters still operate beneficially by exciting, temporarily, the powers of the system, and thereby rendering admissible further bleedings, particularly local bleedings. Sinapisms act in the same manner, but in a less degree. It is, no doubt, proper to advise caution respecting the use of these measures; but I regard as erroneous the recommendation in the text, to restrict their application to cases of pneumonia which are slow in their progress towards resolution, and yet more to the chronic disease, properly so called, and of which the existence is always so problematical.—*(M. L.)*

An objection to the use of blisters on the chest, in the early stage of pneumonia, not noticed by our author, is their interfering, in certain cases, with the proper exploration of the chest by percussion or auscultation. I do not, however, regard this objection as of great weight; as blisters should not be applied in the very early stage, when it is of most importance to institute our physical examinations. When blisters are used they should be of large extent, as from six to eight or even ten inches square.—*Transl.*

Purgatives and Emetics.—It is in general advisable to keep the bowels open in pneumonia, especially on the approach of convalescence; and this object is commonly attained, with sufficient effect by means of glysters and gentle laxatives. Purgatives under the name of derivatives, are employed by some practitioners, with the view of lessening the congestion within the chest.* Emetics have also been much used, either as derivatives or from the inflammation being complicated with bilious disorder. Stoll employed them constantly, in conjunction with bloodletting, in the beginning of the disease; and the same practice was followed by Corvisart. Finke, in the Tecklembourg epidemic, frequently cured pneumonia (which he looked upon as only a concealed form of bilious disease) by emetics alone. At present this mode of practice is very rarely had recourse to, bilious affections being now uncommon and of little severity.

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[*] The *alcaline treatment* of pneumonia was revived in Italy in the end of last century, with seemingly more philosophical views and in a more active form, by the celebrated Mascagni. See his dissertation *Sull' uso del carbonato di potassa per le renelle e peripneumonie.* Mem. della Soc. Ital. delle Scienze, tom. xii. 1804. Partly from theoretical notions respecting the viscidity of the blood in inflammation, but chiefly from witnessing the effect of solutions of the alcalis in gravel, and in dissolving lymphatic concretions and in softening portions of hepatized lungs out of the body, he was led to try and to recommend their employment in pneumonia. And this practice, it is said, was followed with wonderful benefit in an epidemic of this kind in the year 1800. The practice of Mascagni was adopted by his pupil, Dr. Farnese, and by him extended to the treatment of phthisis, and, according to his testimony, with the greatest benefit. See *Elogio del celebre anatomico, P. Mascagni, di T. Farnese.* Milano, 1816. p. 84. 86. 108, et seq. Dr. Farnese's practice was to give the carbonate of potass to the extent of from a drachm to an ounce, in half a pint of water daily. "Whatever be the severity of the pneumonia (says Mascagni), whatever be its stage, this salt procures copious evacuations by the kidneys, the skin, the intestines; and, rendering the expectoration less viscid and more copious and fluid, speedily resolves the inflammatory infarctus of the pulmonary tissue."—The unquestionable effects of alcaline remedies in relieving and curing calculous complaints, as proved by Mrs. Stephen's medicine, and by the more recent and scientific experience of Brande, Magendie, &c., give considerable countenance to the plan of treating pneumonia recommended by Mascagni, and fully justify more ample trials of it. Speaking of the treatment of this disease, Dr. Darwin (Zoon. vol. ii. p. 314) asks—whether neutral salts may not augment cough by their stimulus, as they increase the heat of urine in gonorrhœa? It may be said of Darwin's queries, as of Newton's, that they are often better than other people's assertions; and I think the above is one well deserving our attention, but more so, perhaps, in bronchitis than in simple pneumonia.—*Transl.*

Tonics.—These, and especially bark, are often very useful in the pneumonias of old persons and debilitated and cachectic subjects, especially towards the termination of the disease, when, after the suppurative stage, the fever passes off and resolution goes on very slowly. In the same circumstances the ancients recommended wine,† a practice which I have myself sometimes followed with success. We sometimes even meet with epidemic pneumonias in which bloodletting is constantly hurtful, and the bark beneficial in every stage of the disease. This fact, which cannot be denied, was frequently witnessed, particularly in Germany, towards the close of the last century;‡ and there is no doubt, that Brown's theory was indebted to this medical constitution for a portion of the fame it obtained in that country. Numerous examples of the same kind are recorded in the old *Journal de Médecine*; and I have myself met with many, particularly in the epidemic among the troops in 1814, already mentioned. In gangrene of the lungs, cinchona is the best remedy I have used it successfully, even in cases where the hepatization around the eschar was very extensive; and have sometimes even combined wine and opium with it, when the violence of the inflammatory symptoms had begun to subside. To be effectual it must be given to the extent of an ounce of the powder, or an equivalent portion of the extract, daily. In several cases I have continued to give the sulphate of quinine for more than a month to the extent of eighteen grains in the twenty-four hours. Opium by itself has never, as far as I know, been recommended as a remedy in pneumonia. We even know that it is capable, in large doses, of producing the disease—instances of which I have myself seen subsequent to cases of poisoning. It has, however, been sometimes employed with success in the same circumstances as the bark. With these exceptions, it should only be used, and then cautiously, to quiet nervous irritation, to procure sleep, or to check an excessive diarrhœa.

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* There has been much difference of opinion among authors on the eligibility of purgation in pneumonia. I believe that the use of gentle laxatives recommended in the text, is all that is admissible. The common practice of this country at present is too much disposed towards purgation in all diseases. In pneumonia this practice is attended by many disadvantages; while the beneficial effects expected from it whether derivative or simply depletory, can, I conceive, be obtained much more certainly by other and safer measures. In the not unusual complication of pneumonia with gastric inflammation or irritation, purgatives are very improper, and, I believe, do much mischief in the hands of routine practitioners in this country. —*Transl.*

† Aret. de Curat. Acut. lib ii. cap. 1.

‡ *Bang*, Act. Reg. Soc. Med. Hafn. v. i. p. 256; *Jadelot*, Mem. de la Soc. r... Med. 1776, p. 87; *Frank*, Erläuterungen der Brownischen arzeneylehr. vi. absch. i.; *Horn*, Beytrage Zur. Med. Klin. i. p. 276. 547; *Gebel*, Hufeland Journ. x B. p. 51; *Rademacher*, ibid. xvi B. p. 103.

Alteratives.—The ancients gave the name of *alteratives* to such medicines, as without occasioning any constant or marked evacuation, effected the resolution of different kinds of obstruction, particularly those of an inflammatory character. Almost all these agents we now regard as stimulants of the lymphatic system, and in this way explain their resolvent action: of this kind are the alcalis, neutral salts, purgatives, and even expectorants, such as squills, and especially antimony On the same principle, mercury has of late years been much employed, particularly in England and Germany, although perhaps the practice was still earlier used in Italy by Sarcone. Calomel and the soluble mercury of Hahnemann, are the preparations most used, and with these preparations some physicians may have combined opium, to prevent their action on the bowels. I have not myself had sufficient experience of this method [in pneumonia] to be able to appreciate its merits: but I have employed it enough in other inflammatory affections, particularly peritonitis, to be able to state, that it is not of great power except when carried to the extent of determining an incipient ptyalism, with which the first marks of resolution show themselves. In peritonitis, the inflammatory orgasm decreases as soon as the gums begin to be swollen.*

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* Both opium and calomel, separately or conjoined, have been extensively employed in England, in the cure of pneumonia and other acute inflammations; and with a degree of success which entitles them to the greatest confidence of practitioners, as, at least, powerful auxiliaries of our best antiphlogistic measures. The practice was first introduced to the notice of the profession by Dr. Robert Hamilton of Lynn Regis, in a paper printed in the 9th vol. of the Medical Commentaries. In this paper, which was first published in the year 1785, the author states that he had been in the habit of employing calomel and opium in the cure of inflammatory diseases for nearly twenty years. His practice was, *after bleeding and opening the bowels*, to give "a composition consisting of from five to one grain of calomel, and from one to one-fourth grain of opium, every six, eight, or twelve hours, as the degree of inflammation, or the threatening aspect of the distemper seemed to require; and a plentiful dilution with barley water, or any other weak tepid beverage, was at the same time strictly enjoined." P. 199. He says that after the resolution was taken to make trial of this mode of treatment, pneumonia was the first disease that fell under his care, and adds—that the success attending the administration of calomel and opium in this disease was "such as to fill him with astonishment." P. 196. This practice has been adopted and recommended by many subsequent writers: and I presume there are few practitioners in this country who have not experienced its great power in their own hands. Dr. Armstrong, while expressing his opinion that Dr. Hamilton's plan is defective, inasmuch as the precursory depletion is too slight, and the doses of calomel too small or too seldom repeated, says that it "deserves to be written in letters of gold, on account of its great practical utility." *On Typhus,*

The means above detailed, variously combined, constitute nearly all the curative resources employed by the greater number of European physicians. Judging from the necrological tables published of late years, and from the information I have obtained from the practitioners of different countries, I would state the common result of this method to be, a mortality of one in eight at least, and one in six at most.

Tartar emetic in large doses.—The preparations of antimony have been employed in large doses, either empirically or on theoretical grounds, as a means of cure in different inflammatory diseases. During the seventeenth century, more especially, to judge from the remaining memorials of the controversies of those days, some brilliant cures and many unfortunate events were the consequence of this practice. These latter results may perhaps be attributable partly to the preparations being too

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2nd Ed. p. 244. To the author just named we are indebted not merely for recalling the attention of practitioners to this practice, in the work just quoted, but for an important modification of it in the early stage of inflammatory diseases. See a paper *On the Utility of Opium in certain Inflammatory Disorders*, in the Trans. of the Apothecaries, vol. i. In this paper, although the author recommends calomel to be conjoined with the opium, after the first dose, it is evident that he considers the great benefit of the practice as flowing from the opium alone. This he gives immedi*ately after bleeding to syncope or approaching syncope*, in a dose of at least three grains. Dr. Armstrong expresses himself in the strongest terms of commendation of this method: and I am happy to add my own testimony to the same effect, in the cases where I have had occasion to use it. To such as have not seen the papers of Drs. Hamilton and Armstrong above mentioned, I strongly recommend the perusal of them. The following observations by Dr. Williams on this plan of treatment are extremely judicious, and merit the attention of the young practitioner:—"The efficacy of this combination depends in a great measure on its being given to such an extent as to affect the gums; but its beneficial operation is often manifest before this effect is produced, and in some cases, especially in children, without its occurring at all. But there is seldom that obvious improvement from the first dose which is often apparent in the exhibition of tartar-emetic; the operation of mercury is more gradual, and, as may be expected, when once the system is under its influence, the effect is more permanent. It is therefore especially adapted to the advanced stages of the disease, in which the continued operation of a remedy is required to resolve a solidification of the lung; and in effecting this, and in preventing those remains of inflammation which lay the foundation for destructive chronic disease, mercury is pre-eminently serviceable. Some doubt has existed whether the mercury or the opium is the principal agent in subduing inflammation. Dr. Hamilton considered it to be the calomel, and he combined opium with it to relieve pain and to prevent it from passing off by the bowels. Dr. Armstrong held that the opium was a powerful means of subduing inflammation after bleeding had made a decided impression on the general vascular action. In pneumonic inflammation, however, we cannot but admit that both medicines have their beneficial effects, each by its own influence, and by modifying the action of the other. Thus the opium acts as an anodyne in subduing the pain and cough, and as a sedative in relieving that nervous irritation which often follows both bleeding and the free use of mercury, and which tends to the re-establishment of inflammation; whilst the injurious stimulant and restringent operation of the drug is prevented by the previous bloodletting and the mercury. The latter medicine again, besides this corrigent effect, more gradually exerts that specific antiphlogistic and sorbefacient action which has established its value in many diseases, and of which the treatment of iritis frequently affords a visible illustration. If we adopt this view as a guide in the application and management of these combinations, we shall find that it leads to the rules which experience has already sanctioned." (Cyc. of Pract. Med. vol. iii. p. 442).—*Trans.*

active, and partly to ignorance of the proper method of using them. Be this as it may, we meet with traces of this practice, from time to time, in the writings of the physicians of the last century. I do not here allude to the exhibition of the medicine in small doses and as an emetic, nor to the method of Riverius, who vomited his pneumonic patients with it daily, or every second day; but may remark, in passing, that this practice has always had partisans among practitioners. Every one knows the anecdote of the elder Serane quoted by Borden.* It was constantly followed, to my own knowledge, by M. Dumangin, Physician to La Charité, in pneumonia. This gentleman scarcely ever combined bloodletting with it, and yet his practice was quite as successful as that of Corvisart, who bled much in this disease. But administered in this way, the remedy is an evacuant, and its good effects may consequently be attributed to the derivation operated by it on the intestinal canal.

The employment of kermes mineral as an expectorant may be considered as a relict of its ancient use as an alterant. In the old *Formulaire des Hôpitaux de Paris*, printed in 1764, we find the remains of a still bolder practice, in a potion entitled *in pleuritide et in peripneumonia*, and which consists of four drachms of the white oxyd of antimony in four ounces of the infusion of borrage. The famous *bolus ad quartanam* of La Charité, is another proof of the employment of antimony in large doses, and as an alterant. I have been informed that the practice of giving antimony to this extent, was longer preserved in Italy than in any other countries of Europe. At all events, it is to a modern Italian physician, Rasori, that we are indebted for the revival and demonstration of the utility of this method, which had fallen too much into disuse. I say nothing here of this author's theory, or rather of his modification of the theory of Brown. The doctrine of *stimulus* and *contra-stimulus* has hitherto found partisans only in Italy, and will perhaps never reach beyond the Alps; but practical facts of such importance as those in question, ought to find all medical men, whatever be their theoretical opinions, disposed to put them to the test of experiment. I am unacquainted with the details of Rasori's practice, the first idea of whose method I derived from some medical men who had been in Italy. I began to make trial of it in 1817, and learned at the same time that my colleague, M. Kapeler, had tried it with some benefit, and without any inconvenience, in cases of apoplexy. For a long time I restricted, with him, my trials to this disease: but having occasion to attend two cases of pneumonia, in which venesection was not practicable, I resolved to make use of the tartar emetic in large doses: and the recovery of both patients, equally rapid as unexpected, encouraged me to repeat its employment in many other cases.*

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* *Traité du Tissu muqueux*, *Par.* 1767, p. 221. Serane followed the method of Riverius, and very successfully, in treating fluxions on the chest. His son, however, fresh from the schools, succeeded in persuading him that he bled too sparingly and gave emetics too freely. This produced a singular indecision and inactivity of practice which made him now and then exclaim, when he wished to give an emetic, but did not—*Mon fil, m'abès gastat!* "My son, you have spoilt me!"—*Author.*

I shall here detail the manner in which I administer this remedy, and which differs, I believe, in some respects from that of Rasori. As soon as I recognize the existence of the pneumonia, if the patient is in a state to bear venesection, I direct from eight to sixteen ounces of blood to be taken from the arm. I very rarely repeat the bleeding, except in the case of patients affected with disease of the heart, or threatened with apoplexy, or some other internal congestion. More than once I have even effected very rapid cures of intense pneumonias without bleeding at all; but, in common, I do not think it right to deprive myself of a means so powerful as venesection, except in cachectic or debilitated subjects. In this respect Rasori does the same. I regard bloodletting as a means of allaying, temporarily at least, the violence of the inflammatory action, and giving time for the emetic tartar to act. Immediately after bleeding I give one grain of the tartar emetic, dissolved in two ounces and a half of cold weak infusion of orange-leaf, sweetened with half an ounce of syrup of marsh-mallows or orange-flowers; and this I repeat every second hour for six times; after which I leave the patient quiet for seven or eight hours, if the symptoms are not urgent, or if he experiences any inclination to sleep. But if the pneumonia has already made progress, or if the oppression is great, or the head affected, or if both lungs or one whole lung is attacked, I continue the medicine uninterruptedly, in the same dose and after the same intervals, until there is an amendment, not only in the symptoms but indicated also by the stethoscopic signs. Sometimes even, particularly when most of the above-mentioned unfavourable symptoms are combined, I increase the dose of the tartar emetic to a grain and a half, two grains, or even two grains and a half, without increasing the quantity of the vehicle. Many patients bear the medicine without being either vomited or purged. Others, and indeed the greater number, vomit twice or thrice and have five or six stools the first day: on the following days they have only slight evacuations, and often indeed have none at all. When once *tolerance* of the medicine (to use the expression of Rasori) is established, it even very frequently happens that the patients are so much constipated as to require clysters to open the body. When the evacuations are continued to the second day, or when there is reason to fear on the first, that the medicine will be borne with difficulty, I add to the six doses, to be taken in twenty-four hours, one or two ounces of the syrup of poppies. This combination is in opposition to the theoretical notions of Rasori and Tommasini, but has been proved to me by experience to be very useful. In general the effect of tartar emetic is never more rapid or more efficient than when it gives rise to no evacuation; sometimes, however, its salutary operation is accompanied by a general perspiration. Although copious purging and frequent vomiting are by no means desirable, on account of the debility and the hurtful irritation of the intestinal canal which they may occasion, I have obtained remarkable cures in cases in which such evacuations had been very copious. I have met with very few cases of pneumonia where the patient could not bear the emetic tartar; and the few I have met with occurred in my earliest trials; insomuch that this result now appears to me to be attributable rather to the inexperience and want of confidence of the physician, than to the practice. I now frequently find that a patient who bears only moderately six grains with the syrup of poppies, will bear nine perfectly well on the following day. At the end of twenty-four or forty-eight hours at most, frequently even after two or three hours, we perceive a marked improvement in all the symptoms. And sometimes even, we find patients, who seemed doomed to certain death, out of all danger after the lapse of a few hours only, without having ever experienced any crisis, any evacuation, or indeed any other obvious change but the rapid and progressive amelioration of all the symptoms. In such cases the stethoscope at once accounts for the sudden improvement, by exhibiting to us all the signs of the resolution of the inflammation. These striking results may be obtained at any stage of the disease, even after a great portion of the lung has undergone the purulent infiltration. As soon as we have obtained some amelioration, although but slight, we may be assured that the continuation of the remedy will effect complete resolution of the disease, without any fresh relapse; and it is in regard to this point more particularly, that the greatest practical difference between the emetic tartar and bloodletting consists. By the latter measure, we almost always obtain a diminution of the fever, of the oppression and the bloody expectoration, so as to lead both the patient and the attendants to believe that recovery is about to take place: after a few hours, however, the unfavourable symptoms return with fresh vigour; and the same scene is renewed, often five or six times, after as many successive venesections. On the other hand, I can state that I have never witnessed these renewed attacks under the use of the tartar emetic. In these cases we observe only, in the progress towards convalescence, occasional stoppages. And this is more particularly the case in respect of the stethoscopic signs; as we find that, between the period when the patient experiences a return of his appetite and strength, and fancies himself quite cured, and the period at which the stethoscope ceases to give any indication of pulmonary engorgement,—more time frequently elapses than between the invasion of the disease and the beginning of the convalescence. It is necessary to observe, however, that this remark is still more frequently applicable to the disease when treated by bloodletting; and moreover, that the patients subjected to the antimonial method never experience the long and excessive debility which too often accompanies the convalescence of those who had been treated by repeated venesections.

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* It was in 1821 that Laennec began to employ the tartar emetic in large doses in pneumonia and some other inflammatory diseases; and at this period he might truly say that he was unacquainted with the details of Rasori's practice, as it was then very little known in France. In 1825, however, when he printed his second edition, he was not ignorant of it, M. Fontaneilles having given an account of it twelve months before, (*Archives Gén. de Méd.* Fev. et Mars, 1824,) in his Translation of Rasori's *Memoir on Pneumonia and the Mode of treating it by Emetic Tartar.*—(*M.L.*)

The best way of appreciating any particular mode of treatment is by its results. I am sorry to say that I only began last year [1824] to keep an exact account of the results of mine by the tartar emetic; but I can affirm that I have no recollection of death from acute pneumonia in any case where this medicine had been taken long enough for its effects to be experienced. I have only witnessed a few fatal terminations where the case was a slight pneumonia complicated with severe pleurisy. (We shall find, when we come to treat of the latter disease, that after the first stage, the emetic tartar has little effect in it.) I have also lost some patients who, besides the pneumonia, were affected with cancer, phthisis, disease of the heart, &c.; and these are the cases where I had an opportunity of observing the different degrees of resolution in this disease. Finally, I have lost some who were brought to the hospital moribund, and who sunk before they had taken more than two or three grains of the remedy.

In the year 1824, at the Clinic of the Faculty of Medicine, I treated by the tartar emetic twenty-eight cases of pneumonia, either simple or complicated with slight pleuritic effusion. Most of these cases were very severe, yet they were all cured, with the single exception of a cachectic old man of seventy, who took but little of the medicine because he bore it badly. During the present year [1825] I have treated thirty-four cases in the same manner. Of these, five have died; but of this number two women, one aged fifty-nine and the other sixty-nine, were brought to the hospital moribund, and sunk before they had taken more than two or three doses of the emetic tartar; a third died of disease of the heart when convalescent from the pneumonia; and a fourth fell a victim to chronic pleurisy, also in the period of resolution of a sub-acute pneumonia. These two last cases will be detailed hereafter; the one at the end of the present chapter, the other in the section on pleuro-pneumonia. The fifth case was that of a man, seventy-two years of age, who died of cerebral congestion on the tenth day of the disease. Of these five cases, then, the two first cannot be adduced in either way as instances of the effect of this remedy; and the two next afford proofs of its efficacy in *pneumonia*, rather than the contrary. The result, therefore, of the whole is, that of fifty-seven cases of pneumonia treated by the tartar emetic, only two individuals, both upwards of seventy, died of this disease conjoined with cerebral congestion,—that is, a little less than one in twenty-eight.* In private practice, during the last three or four years, I have not been called, in consultation, to cases of acute pneumonia, or to cases uncomplicated with violent pleurisy, except such as appeared already threatening a fatal termination; and yet I do not remember a single case which proved fatal under the use of the emetic tartar, except that of a plethoric subject, aged seventy-two, whom I attended along with Dr. Juglar. This patient laboured under a relapse of pneumonia after a delusive convalescence, the third attack of the kind he had had during the preceding fifteen months. The fever was intense, with *sub-delirium* and other signs of cerebral congestion. He took the emetic tartar to the amount of six grains daily for two days: *tolerance* was established on the second day; the pneumonic symptoms decreased; the expectoration became again mucous; but he sunk on the third day from an increase of the cerebral congestion. To this case I can oppose two others where the probabilities of success were less, and where, nevertheless, a rapid recovery took place.

A man aged forty-five, weakened by various excesses, was seized with pneumonia in 1823. I saw him on the fourth day in a state almost hopeless. The right lung was affected throughout, notwithstanding venesection had been repeatedly used. There was extreme oppression of the chest; and, during the last twelve hours, jaundice, with pain in the region of the liver, had come on, indicating the supervention of hepatitis. I recommended the tartar emetic, which the attendant, Dr. Michel, the more readily agreed to, from having seen it used by Rasori at prescribed twenty grains to be taken during the ours, in two-grain doses; but by mistake about ere given, within the same period. This treatment u but little evacuation, and on the following day, we jaundice, the pain, and the oppression gone, the stethos perceptibly improved, the fever less, and the patient, ort, out f danger. Convalescence proceeded without any

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* In this calculation Laennec has included all the cases of pneumonia received into the Clinic, without distinction as to severity or mildness. Such a distinction, however, is necessary to enable us to appreciate accurately the effect of the treatment on the mortality. It cannot be proper to take into account, in such comparative statements, cases so slight that abstinence from food, confinement to bed, a few leeches, or a very trifling venesection, sufficed to cure: and yet I know that of the fifty-seven cases of pneumonia cited in the text, the fourth part at least, more especially of the thirty-four treated in 1825, were of this kind. In reckoning only the cases of well-marked pneumonia and in which there was time for the remedy to take effect, the mortality, according to my notes, ought to be reckoned as one in twenty or even eighteen. It is probable that a similar correction may apply to the results of treatment recorded by M. Benaben who informs us, in a very interesting memoir recently published in the *Revue Médicale*, (Oct. and Dec. 1829,) that he only lost one patient in forty-five.—(*M. L.*)

325, I was called to M. de C—, aged 65, by M. eauvais and Jadioux. I found the patient in the enth day of pneumonia. He had been repeatedly bled with ked relief, but this was always speedily followed by a reval of the violence of the dis Since the preceding day, had been insensible, and he lay with the tracheal rhonis of the dying, and covered a sweat, which felt cold on extremities. Two days he debility not justifying the s of more blood, tartar id been tried; but the first es having increased a which the patient laboured ler, and the evacuations casioned syncope, the medi was suspended after tw e grains, at most, had been n. On examination, both were found to be affected: right, over a great extent an advanced state of hepa ation; the left at the roots a se, in the stage of engorgent and incipient hepatization. I recommended the aromatic antimonial infusion, in doses of a grain and a half of the tartar emetic, with the syrup of poppy. The patient bore the medicine well, and took eighteen grains during the first twenty-four hours. It did not occasion more purging than had previously existed. During the administration the patient recovered his consciousness; the rhonchus, sweat and oppression disappeared; and when we saw him on the following day, we found him decidedly convalescent, the stethoscopic signs indicating resolution. The medicine was continued for some days, and convalescence proceeded without any fresh relapse. It was questioned whether the sweat which existed at the time when the tartar emetic was administered, might not have been critical in this case. I cannot believe that a perspiration of the kind described, coming on with cerebral congestion and the tracheal rhonchus of the moribund can be considered as critical, more particularly as it, as well as the other mortal symptoms, passed off during the use of the antimony.

The above results of my practice are more favourable than those of Rasori's, lately published.* This may be owing to two causes,—first, because auscultation enables us to ascertain the existence of pneumonia much quicker than we could do from the ordinary symptoms; and, secondly, because, in all probability, many cases of simple pleurisy, or of pleuro-pneumonia with predominance of pleurisy, are comprehended by Rasori under the name of *pneumonia*,—it being impossible to discriminate these different affections from each other, without the aid of auscultation. I have already stated that we must not expect equally favourable results in the treatment of pleurisy, as in the treatment of pneumonia, by the tartar emetic.

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* Archiv. Gén. de Méd. t. iv. Mars 1824.

My cousin, Dr. A. Laennec, physician of the Hôtel Dieu of Nantes, has treated with the tartar emetic, during the last two years, forty cases of pleuro-pneumonia. Of these six proved fatal, three in consequence of errors of regimen during convalescence. Subtracting these, then, the proportion of deaths will be one in thirty.[*] Dr. Hellis of Rouen has lately presented to the Royal Academy of Medicine, a memoir on the treatment of pneumonia after the method of Riverius and Stoll, that is, by repeated emetics.[†] Of forty-seven cases treated by him he lost only five, being a proportion somewhat less than one in nine. This result, although much less favourable than that which has followed the use of the tartar emetic in large doses in my practice, is yet more so than that obtained from the employment of bloodletting and derivatives, which I have stated to be one in six or eight. Independently of being less successful, the practice of Riverius has not even the merit of being more gentle than that of the tartar emetic in large doses; as the repeated evacuations produced by it occasion great distress to the patients and alarm to the attendants, while such effects take place, in the other method, at most only on the two first days. I continue the use of the medicine as long as the *tolerance* lasts, and while there exists any remains of the crepitous rhonchus. This tolerance I every day find to continue indefinitely, in patients in full convalescence,—a fact which is not in accordance with Rasori's theory. If I have been correctly informed, he considers the tolerance as owing to the excess of stimulus existing in the system, and which produces the disease; and, according to him, as soon as the excess of stimulus is destroyed by the contra-stimulant effect of the tartar emetic, the tolerance ought to cease. It is certainly true that after the acute period of the disease, the tolerance diminishes or sometimes entirely ceases; but it is more common to find the patient become habituated to the medicine, insomuch that, during convalescence and when he has begun to use as much food as in health, he will take daily, without knowing it, six, nine, twelve, and even eighteen grains of the emetic tartar. Putting aside entirely the question of theory, I agree with Rasori in opinion, that the tartar emetic is in general better supported, and produces more speedy and powerful effects, in proportion as the patient's constitution and the symptoms of the disease bear the marks of great plethora and high vital action; but I must, at the same time, remark, that similar results are occasionally obtained in debilitated and cachectic subjects, who have not been able to bear bloodletting, notwithstanding the presence of an intense local inflammation.

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[*] An account of seventeen of these cases is published in the *Journ. de Méd. de la Soc. de la Loire Infér.* for Sep. 1825. These are all severe cases, and the results are consequently more conclusive than those recorded in the practice of our author. One of these cases (the tenth) afforded a well-marked instance of a cure of pulmonary abscess, and finely corroborates the statement advanced by me in a former note of the necessity of the presence of a peculiar form of expectoration in such cases. At the same time that an imperfect pectoriloquy and guggling rhonchus were observed, the patient expectorated copiously during two days, "sputa at first red, then resembling the washings of flesh, and finally yellower and almost purulent;" and when this temporary discharge had ceased, the pectoriloquy became perfect, the cavernous rhonchus disappeared and was replaced by a very pure *cavernous respiration.*

Ever since, Dr. Ambroise Laennec has continued to treat pneumonia with tartar emetic in large doses, in the Hôtel Dieu of Nantes and in his private practice, and always with a result as satisfactory at least. His plan is to commence with bloodletting, repeated according to circumstances, and not to administer the antimony unless the first bleedings have produced no marked amelioration. But if the inflammation occupies both lungs at the same time, or if it have already reached the stage of hepatization,—in other words, if the physical signs and general symptoms indicate the presence of a disease so severe as to threaten an unfavourable result,—he prescribes the tartar emetic from the very beginning, and, in imitation of Rasori, proportions his doses to the severity of the disease.—*(M. L.)*

[†] This memoir has since been published by the author under the title *Clinique Médicale de l'Hôtel Dieu de Rouen*, Première Année. Paris 1826. From this work, and also from another now before me entitled *Mémoire sur les fluxions de poitrine*, par Louis Valentin, M. D. Nancy, 1815; it would seem that the practice of giving emetics in pneumonia, so much employed formerly by Stoll and others, has still many partisans in France.—*Transl.*

Upon comparing the facts which I have witnessed in my own practice, I am convinced that the *tolerance* depends on the concurrence of several circumstances. In the first place, the medicine in considerable doses is less emetic than in small doses; an observation which had been already made by most practitioners. In the second place, the habit which accustoms the stomach to all sorts of substances seems readily formed in respect of this, since we find that vomiting or purging almost always follows its administration on the first day, and scarcely ever returns after the second. A third circumstance which contributes much to the prevention of vomiting is the ingestion of the medicine in an agreeable vehicle, somewhat aromatic and moderately diluted. The intervention of a period of two hours between the doses also contributes to the same result. I have excited copious vomiting by means of the tartar emetic given in doses of two grains in three ounces of warm water, every quarter of an hour, in the commencement of a bilious pneumonia; while the same patient has taken it on the following and subsequent days, in doses of from six to nine grains, in the manner formerly mentioned, without experiencing evacuations of any kind. When the flavour of the orange-leaf is disagreeable to the patient, I give the medicine in some other aromatic infusion, or sweetened emulsion. When it occasions too copious evacuations, I conjoin with it, as I have stated above, a small quantity of opium,—the only corrective of its operation in this way that I have been able to find. Cinchona certainly does not act in the same way, although it has been supposed to neutralize the tartar emetic in the *bolus ad quartanam* of La Charité* There is no doubt that bark, as well as the various vegetable infusions usually combined with tartar emetic, more or less decompose this medicine; but this change of state does not seem in any way to affect its virtues, since we find that one or two grains dissolved in a pint of vegetable broth, lemonade, decoction of tamarinds, or even strong decoction of bark, will produce very effective vomiting: and this result we also observe occasionally from the *bolus* above mentioned, especially when given in small doses.

The practice above detailed is not in reality so bold as it seems at first sight; since only one, two, or at most three grains of the tartar emetic are given at one dose,—a quantity which practitioners have been long accustomed to administer. The medicine is, moreover, given much diluted, and is thereby deprived of all the caustic properties which it possesses. These, be it remembered, are but feeble, since we know that it only then produces pustules when it is applied in substance, and retained in contact with the skin for two or three days.† In prescribing the medicine, we are careful not to repeat the dose if the preceding has occasioned any ill consequence, a circumstance which will always obviate any risk from its employment, in the hands of the prudent and active practitioner. I have been in the daily habit of employing the tartar emetic in the hospital since 1816, and more particularly since 1821; and I do not think that any of those who have observed my practice, have ever witnessed any ill effect of consequence, from its administration. And I can give a like report of its effects in my private practice, with this single exception, that I have observed, in the latter, vomiting to be more frequent than in the hospital. This difference of result has appeared to me owing to the patients being informed by the nurses or their friends, that they were taking tartar emetic, a thing which I have always been anxious to conceal from them.

I have employed the tartar emetic in large doses, in many other diseases besides pneumonia, particularly in other inflammatory affections, and in fluxes and congestions of an active or hypersthenic kind. Convinced of the importance of this mode of l of the administration of many other medicines in loses than are usual, I think it right to give in this account of the principal results which I have ob- n this way. 1. Although emetic tartar answers in gen- well in inflammatory and sthenic diseases, all inflammation not yield to it in the same degree. 2. In the inflammation erous membranes, and particularly in pleurisy, the remedy is ely *heroic*, and never unless the disease is very acute. It is ed reduces speedily the inflammatory action; but when the er and pain have ceased, the effusion does not always disappear more rapidly under the use of the tartar emetic, than without it. I have not yet had an opportunity of trying the effect of medicine in peritonitis, and indeed I should feel unwilling to so, on account of the admi effects which I have found m another kind of practi namely, of mercurial inunc- n, carried rapidly to sali ter one or two applications leeches. In a case which ed all the symptoms of acute nitis, I obtained a co re by the tartar emetic in a of forty-eight hours three instances, and nearly same space of tim on l all the symptoms of acute rocephalus disappear se of the tartar emetic. In of these, the cerebral upervened in the course of tinued fever. The thir d in the person of a young n, who, after long watching, eized with vertigo and other signs of cerebral disorder. For e complaints he had leeches and cold lotions applied, but without benefit: at the end of two months he fell into a fit, and, after five days, was brought into the Necker Hospital. At this time he was insensible, motionless, extremely pale, and with the pupils much dilated. Leeches were ordered to the temples, but only eight fixed, and drew little blood. I prescribed, at the same time, twelve grains of the tartar emetic to be taken in twenty-four hours. On the following day he could move and speak a little. I then ordered fifteen grains of the medicine, and found him, on the succeeding day, much better: although still very weak, he had regained entirely both sense and motion, and the pupil was now hardly at all dilated. As he had had no evacuation of any kind, I prescribed eighteen grains of the tartar emetic and also some food. On the sixth day he was completely convalescent, and had recovered his appetite. He continues in perfect health. I formerly stated that I have found this medicine useful in the suffocative catarrh of adults, and in œdema of the lungs, especially when these affections are combined with slight pneumonia. Dr. Ambrose Laennec has effected, by the same means, a cure of a

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* The *bolus ad quartanam* used by M. Laennec in Necker hospital, the same I presume as that of La Charité, consists of one grain of the emetic tartar to the dram of bark, made into a mass by extract of juniper. (*Ratier*, Formul. de Hôpitaux, p. 193.) —*Transl.*

† A strong solution will have the same effect; and this, and still more the medicine in substance, will commonly produce its characteristic irritation much sooner than is stated in the text.—*Transl.*

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[*] *Revue Méd.* Juin, 1825, p. 344. But the efficacy of the antimony may be questioned, as the improvement did not occur until after bloodletting from the —(*M. L.*)

very violent idiopathic tenatus, in the space of a very few days.[*] I had lately under my care an acute inflammation of several of the veins in the arm, treated in the same way. The basilic vein was greatly enlarged, hard as a cord, and its course indicated on the skin by a line of a deep red colour. The fore-arm was very hard, enormously swollen, and presenting a mixed character of œdema and erysipelas. It was generally pale and shining, but in many places it was of a copper colour and very sensible to the touch. There was high fever, but the head was not affected. I ordered twenty-four leeches to be applied to the vulva, and six grains of the emetic tartar to be administered. On the following day the inflammation and fever had subsided, and at the end of three days, complete resolution had taken place. This cure will no doubt appear remarkable to such practitioners as have had occasion to see cases of acute phlebitis, and who know how rarely and difficultly it is cured by loss of blood.[†] In some cases of acute chorea, I have found the medicine beneficial, but not in an extreme degree. This is the only nervous affection in which I have made trial of the practice, and only in cases which appeared connected with a congested state of the brain or spinal marrow. Articular rheumatism is, next to pneumonia, the inflammatory disease in which the tartar emetic has appeared to me the most efficacious. The usual duration of this complaint, treated by the antimony, is from seven to eight days; and I need hardly say that, when treated by bleeding, or on the expectant system, it lasts from one to two months. This remedy, however, succeeds less perfectly when muscular rheumatism is combined with the articular. Occasionally I have found a relapse of the articular inflammation to take place during the continuance of the antimony; and in two cases I was obliged to leave it off from not being able to effect the *tolerance*.—In some cases of severe ophthalmia and angina, I have obtained as speedy cures as in pneumonia.[‡]—I have not hitherto made use of the emetic tartar in simple inflammation of the intestinal mucous membrane; but in cases of pneumonia or articular rheumatism, I have not been deterred from using it, by the presence of redness of the tongue, considerable pain of the epigastrium or abdomen augmented by pressure, or diarrhœa and tenesmus. In such cases I have observed the symptoms just mentioned to disappear under the influence of the remedy, as speedily as those of the principal disease. In a word, I do not consider the *gastro-enteritis* of fevers as contra-indicating the use of the emetic tartar. And in fact, do we not find many external inflammations, ophthalmias for instance, yield much sooner to the use of gently stimulating topical applications than to bleeding and emollients?* The contra-indications to the use of this, as of all other medicines, ought, in my opinion, to be founded on experience alone. The chief of these contra-indications is, defective tolerance, announced by too copious evacuations. Some diseases, apparently as active and inflammatory as those above mentioned, do not give way under the use of the emetic tartar even when it is the best supported. I formerly stated hæmoptysis to be one of them; and to this I may add apoplexy, gout, erysipelas, and most chronic inflammations, except some of those which have degenerated from the acute to the chronic state. In cases of this kind, I have seen the medicine supported perfectly well, in doses of from nine to twelve grains a day, without any obvious result. In some cases of apoplexy I have gradually increased the dose to a dram and a half, without any sensible effect; while, in others, I have seen the symptoms of cerebral compression disappear in a few hours, and all marks of paralysis pass off rapidly. This fact of complete *tolerance* existing without any effect on the disease, is strongly against the theory of Rasori and Tommasini. In my opinion it is enough for the practical physician to be able to appreciate the effects of a remedy, and to determine experimentally the cases in which it is useful. At the same time, if in the present instance it is thought of use to ascertain the mode of action of the remedy, I should say that its most constant effect is the rapid resolution of inflammation, and sometimes the equally speedy absorption of the inflammatory effusion. I have thus seen, in the case of articular rheumatism, a well-marked fluctuation in the knee-joint disappear in the course of six hours. In such cases we cannot attribute the result to derivation, since this is never more marked than when there has existed neither vomiting nor any other kind of evacuation. Sweats, it is true, and also a copious flow of urine, sometimes accompany the resolution: but these are by no means constant. For these reasons, it appears to me that the only way in which we can explain the action of this medicine, in the present state of our knowledge, is, by admitting that it increases the activity of the *interstitial* absorption, particularly when there is present in the system an excess of energy, tone, or plethora. I ought further to remark in this place, that, after having cautiously tried the effect of this medicine in a few cases of dropsy of an asthenic character, particularly

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[*] This case is reported in Bayle's *Bib. de Therap.* (t. i. p. 298.) Two other cases of idiopathic tetanus have been since treated by Dr. A. Laennec, in the same manner and with like success. (See *Bib. de Therap.* p. 506, and *Revue Méd.* Oct. 1828.)—(*M. L.*)

[†] See a full account of this case in the *Revue Méd.* for Oct. 1825.

[‡] M. Bayle in his *Bib. de Therap.* (t. i. p. 289,) has inserted a note communicated by me, giving an account of some of the facts referred to in the text. I will only here notice those which relate to articular rheumatism. Thirteen cases were treated with the tartar emetic with the following results:—in one, the remedy was injurious; in two it was inefficacious; in two, its success was doubtful; in eight, it was evidently useful. These results, although interesting, only afford an approximative view of the practice of Laennec. He treated in the same way all the cases of rheumatism admitted into his clinic, (with 120 beds,) in the Necker, in 1822, and the first three months of 1823; and if I had kept more accurate notes, the number of observations might have been much greater.—(*M. L.*)

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* In a former note I have referred to the not infrequent complication of pneumonia with gastric inflammation, and of the impropriety of exhibiting purgatives in such cases. My objection must necessarily be still stronger and more valid (if at all valid) against the use of tartar emetic in large doses; and I must, therefore, enter my protest against the treatment recommended in the text in all instances of this complication. I have already hinted at the marked dislike, I might almost say unjustifiable prejudice, of our author to the doctrines of Broussais; and I fear I must be so uncharitable as to receive with some degree of caution not only his judgments, but even the statements of his observation, when these bear very directly upon the favourite doctrines of his rival. I am very far from assenting to the *system* of Broussais as a code of medical doctrine; and am ready to admit the absurdity of not a few of his opinions, and the impropriety of a good deal of his practice in several diseases; at the same time I feel it due to him to say, that I consider *practical* medicine under deeper obligations to him than to any other individual who has appeared during the present century, perhaps during the last fifty years. His great merit consists, as is well known, in having almost discovered, certainly in having clearly demonstrated, the precise nature and extreme frequency of inflammation or irritation of the mucous membrane of the stomach and bowels, and in having pointed out the vast importance and indeed necessity, of attending to this in all cases where it exists, in order to ensure any chance of success from the application of our remedial measures. The best proof of the value of M. Broussais's doctrines is found in the fact of their having modified, in a greater or less degree, the practice of the physicians in every country of Europe; and it is obvious to every one that, even in England, where much opposition has been shown to them, they are at this moment influencing the conduct of most of those who are loudest in decrying them. In respect of the administration of the emetic tartar in pneumonia complicated with gastric disorder, I should say that it requires the utmost caution generally, and the greatest attention to each particular case, in order to guard against producing great mischief by it. In many of those cases of gastric complication recorded by Stoll, Riverius, Hellis, and others, where the affection consists rather in a loaded condition of the stomach, duodenum and liver, and a vitiated state of their respective secretions, than in inflammation or high irritation of the mucous membranes, no doubt the emetic tartar may be valuable, at all events as an emetic; but where evident signs of the other condition of parts exist, we cannot administer this remedy without imminent danger of augmenting the evils we are attempting to alleviate. That even in these latter cases the emetic tartar is sometimes useful, I do not deny; but I believe Broussais's opinion on this point will be found to be generally correct: he says, speaking of emetics in simple inflammatory affections of the stomach, "leur effet est incertain dans les cas legérs; et dans les graves, ils sont toujours dangereux, parcequ'ils ne manquent jamais d'augmenter l'inflammation qu'ils n'ont pas réussi à enlever." *Propos. de Méd.* Prop. cclxxxvii. But my principal object at present is to call the attention of practitioners to the frequent co-existence of gastric affections with pneumonia in this country, and to point out the absolute necessity in such cases of treating *both* diseases at the same time. In the simple disease we shall generally find our bleedings from the arm and our tartar emetic, according to the French phrase, *heroic*; while in the complicated affection, we shall find these means, if not injurious, at least inefficacious, if we fail to attack the gastric affection with leeches to the epigastrium, saline refrigerants, mucilaginous diluents, &c., and if we do not forbid the ingestion of stimulant purgatives and other irritants, at least for a season. I cannot conclude this note

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without particularly calling the attention of practitioners to some most valuable practical remarks on the complication now under consideration, contained in the Appendix to Dr. Philips's excellent treatise on Indigestion. (See particularly pages 77, 81—85.) These remarks, I doubt not, will be novel to the great majority of his readers; and will probably be received with more consideration from being the result of his own practical observation. At least, I conclude from his having made no allusion to any continental writers, that the author is unacquainted with their previous observations in this particular case. My own attention was first called to this important subject by my most intelligent and observant friend, Dr. James Clark, formerly of Rome, now of London.—*Transl.*

in ascites and anasarca, the consequence of disease of the heart or liver, without any beneficial result, I have abandoned the practice in such circumstances. On the other hand, in a case of acute anasarca of the extremities complicating a similar affection of the lungs, I found the practice completely successful; and I am of opinion that it would be frequently useful in the anasarcous swellings produced by measles and scarlatina.*

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* Since its first introduction into the practice of medicine, antimony, in one form or other, has been very generally and extensively used by the physicians of every nation in Europe. Like all powerful remedies, it has been, at different times, the subject alike of commendation as of reprobation, equally unmeasured. When first introduced by Paracelsus, it was considered as an antidote to the most terrible diseases, and was used and esteemed as such in the plague of 1562. Only four years after this, however, it was declared poisonous by the Parliament of Paris, and its use interdicted under severe penalties. Further and more extensive experience restored the remedy to its legitimate rank in the materia medica; and since the middle of the last century, more especially, it has been very generally and extensively used in febrile and inflammatory diseases, principally in the form of emetic tartar. In proof of this we may refer to almost every practical writer during the last sixty or seventy years. Among the most eminent of those who used it extensively during the last century may be mentioned Brendel, Richter, Hirschel, Stoll, Gmelin, Riviere, Pelligrini, Huxham, Pringle, Cullen, Withers, &c. &c. Some of these used the medicine chiefly as an emetic, but most of them as a diaphoretic, and in doses sufficient to produce nausea. The partiality of Dr. Cullen to this medicine is well known; and it seems at present probable that this partiality will henceforward be as much cited to his praise, as it has been often hitherto adduced to his discredit. There can be no doubt, however, that it is to the Italian physicians, and especially Rasori, that we are indebted for the introduction of the tartar emetic in large doses, as a cure for inflammatory diseases. The author just mentioned first used it in the epidemic fever of Genoa, in the year 1799 or 1800, giving it in doses of four, six, eight, or more grains in the course of the day, in any watery vehicle the patient preferred. (See *Storia della Febbre petechiale*, &c. &c. di G. Rasori. Terza edit. Milano, 1813, p. 38.) Soon after this period, the author appears to have employed this remedy, yet more extensively and in larger doses, in pneumonia. In his memoir on this disease, referred to by Laennec, as translated into French by Dr. Fontaneilles, and published in the *Archives Gén. de Méd.* for 1824, he gives the result of his clinical practice with the tartar emetic in pneumonia, in the years 1808, 9, 10. His general method was to commence the medicine, usually after one or more bleedings, but sometimes without any previous depletion: "I seldom begin (he says) with less than twelve grains during the day, and as many during the night. If I find the disease already advanced, I begin with a scruple or half a drachm, and go on daily increasing the dose, until it amounts to a drachm, or even several drachms, in the course of the twenty-four hours." The result of this practice was on the whole successful; the number of deaths being only one hundred and seventy-three out of eight hundred and thirty-two cases of pneumonia treated by him; or about twenty-two per cent. in the civil hospital, and fourteen per cent. in the military. It would appear, however, from the testimony of others, that Rasori's practice has been far from being always so successful. Wagner informs us (*Darstellung und Kritik der Italianischen Lehre vom Contrastimulus.* Berlin, 1819,) that out of thirteen cases of pneumonia, no less than seven died—victims, according to this writer's belief, more to the practice than the disease. In 1808, M. Fontaneilles, the translator of Rasori's essay sent an account of this author's practice to the *Société de Médecine de Paris*, in a memoir which was afterwards published in the year 1819, in vol. xl. of the "*Annales Cliniques de Montpelier.*" Since the introduction of it by Rasori, the emetic tartar has been in very general use by the Italian physicians, as sufficiently appears from the writings of Brera, Tommasini, Fanzago, Borda, Rubini, Gentile, Pozzi, Tozetti, &c. Tommasini states, that out of one hundred and fifty cases of pneumonia, treated with the tartar emetic, (conjointly with bleeding, &c.) only fourteen died: see his works—"*Della nouva dott. Ital.*" Bologna, 1816; "*Delle peripneumonie inflammatorie e del curarle principalmente col tartaro stibiato,*" Bologna.

I have made trial, in large doses, of some other medicines, which, according to the statements of the Italian journals, would

1817; "*Prospetto dei Resulti, &c.*" Pisa, 1823; and Dr. Gentile of Naples says he lost only one in forty. In the *Bibliothèque Universelle* of Geneva for June, 1822, there is a memoir by M. Peschier on the use of this remedy in the same disease, in which he gives the most surprising account of its success. His mode of using it was to dissolve six, twelve, or fifteen grains, in six ounces of water, and to give a table-spoonfull every second hour, day and night, together with an aperient ptisan; adding occasionally, according to circumstances, æther, nitre, or tincture of opium. He usually began with the smaller dose, increasing it by three grains daily, but never exceeding fifteen in the twenty-four hours. In this manner he had treated all his cases of pleurisy and pneumonia for the preceding five years, and, according to his account, had cured almost all of them, in a short space of time, without bloodletting, and generally without even blisters!—Much about the same time that the Italian treatment was embraced by M. Laennec in France, Dr. Balfour appears to have adopted it in Edinburgh, and to have followed it up with vigour and success. The results of his practice were first given to the public in 1818, and excited considerable interest; as may be inferred from the appearance of an enlarged edition of his work next year, under the title of "Illustrations of the power of emetic tartar in the cure of fever, inflammation and asthma, and in preventing consumption and apoplexy." Dr. Balfour's general practice appears to have been to give the medicine in doses of one-third or one-half of a grain every hour, usually, but not always, combined with an aperient neutral salt. The remedy in the hands of this author seems to have been productive of very similar effects to those recorded by the continental physicians. Some of his cases afford very striking and unequivocal proofs of the great efficacy of the practice; although I suspect few of his readers will coincide with him in some of his conclusions. Shortly after the publication of Dr. Balfour's work, the practice recommended in it was adopted by Mr. Jeffreys, in several surgical diseases; and in his work entitled "*Cases in Surgery*," published in 1820, seventeen cases of external local inflammations are given, treated by the tartar emetic with distinguished success. The practice appears to have become much more generally known and adopted, more especially in Germany, since the publication of Peschier's memoir; although neither this author, nor the French or English writers already mentioned, can lay any claim to the discovery or invention of the method, the honour of which seems justly due to Rasori. In Hufeland's "*Journ. der prakt Heilkunde*" for March, 1823, Dr. Wolff, of Warsaw, gives an account of his great success from this method; and a similar report is made by Dr. Wesener, in the same Journal for May, 1824. In a thesis by Dr. Burghardt, (printed at Berlin, in 1824,) "*De tartari emetici in pectoris inflammationibus usu*," the efficacy of the remedy is considered as fully proved, and several original cases, illustrating its powers, are given. To the body of evidence above referred to, together with that adduced by Laennec in the text, it is hardly necessary that any thing should be added, to ensure the reader's assent to the great powers of emetic tartar in subduing inflammation of the lungs. I think it right, however, to state, that my own experience of its effects, though limited, is decidedly in favour of the remedy. During the last six years I have used it (after pretty copious venesection, however) in a good many cases of pneumonia, and in a few of acute rheumatism. In all these cases the termination was favourable; but I know too well the extreme difficulty of obtaining certain conclusions in practical medicine, to feel justified in asserting my positive belief, that the cure was in all the effect of the tartar emetic. I cannot be mistaken, however, in stating the result of my own experience to be, that, in pure pneumonia, the tartar emetic, in large doses, is the most certain and powerful remedy we possess, excepting, perhaps, bloodletting; and that in many cases it is capable of producing the most striking and beneficial effects, when bloodletting is no longer applicable. Indeed I must say, that I regard this remedy, in the proper cases, as yielding to no single therapeutic agent in potency of effect. Like those of quinine and a very minute minority of other medicines, its happy effects, unequivocally demonstrated, tend to keep alive in the mind of the philosophic physician, that faith and confidence in the powers of his art, which are in constant jeopardy from the loose observations, inconsequent reasonings, and overweening pretensions of every-day practitioners. In no instance but one have I seen any bad effects from it; and in this, it was incautiously administered without due reference to the co-existence of gastric irritation. The only objection to its use appears to me seem to be placed by Rasori and Tommasini nearly on the same footing as emetic tartar; such as the kermes, the yellow sulphuret of antimony, nitre and digitalis. Of the two latter I shall speak when I come to treat of pleurisy. Of the antimonial preparations, I may say that I have not found them of much

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to be the severity of its operation, previously to the establishment of *the tolerance.* In several cases I have found the tolerance to exist from the first; in the majority, it was speedily established; in others, distressing nausea continued for a good many hours, and in most of them there were also both vomiting and purging. After a short time, however, all the obvious effects of the medicine, if we except sweating, ceased, and returned no more, although it was continued for several days afterwards. Of the mode of action of this medicine on the system in producing the resolution of inflammation, there are many opinions advanced by various authors; and it would be no very difficult matter to propound more, equally plausible at least. The theory of Rasori is not, I imagine, very different in reality from that of Basil Valentine (or whoever was the author of the *Curris Triumphalis* of Antimony,) who says that although in itself antimony is a poison, yet that having the power to drive out the poison of the disease, it thereby becomes a most peerless remedy; and I am not sure that Dr. Balfour's aphorism ("increased arterial or inflammatory action, is incompatible with the presence of emetic tartar in the system,") tells us any thing more than what we knew (or believed) before, viz. that the remedy cured the disease.

In the new edition of the present treatise, Dr. Mer. Laennec, after referring to the vast body of evidence now collected on the subject of the effect of tartar emetic in pneumonia, naturally asks how it has happened that so large an experience has not established with certainty the good and evil of this treatment? This he attributes to the following causes: because, on the one hand, the partisans of the practice have announced their statements too enthusiastically, concealing or depreciating the effects attributable either to nature or to other remedies employed simultaneously, and because they have not taken proper account of the severity, stage, and other circumstances of the cases; and because, on the other hand, the opponents of the practice have greatly overrated the ill effects which it may have had, in some cases, on the digestive organs. "However, (continues Dr. Mer. Laennec,) no honest man who carefully weighs all the evidence, can hesitate to assent to the truth of the two following propositions: 1. Emetic tartar may be given, in doses of from six grains to a drachm in the twenty-four hours, in pneumonia, without producing, as might have been expected, any inflammation of consequence in the gastro-intestinal mucous membrane; 2. Tartar emetic in large doses given singly or in conjunction with bloodletting (and most certainly if so combined) is of undoubted efficacy in pneumonia, and almost always brings about a cure, which mere antiphlogistic remedies, singly or combined with other measures in ordinary use, could not have effected."

I find from a note to Dr. Williams's Treatise on Pneumonia in the *Cyclopædia of Pract. Med.* that Dr. Marryat of Bristol, who died in 1793, is justly entitled to the honour of priority in the administration of the tartar emetic in large doses, as the following extract from the last edition of his "*Therapeutics*" published in [illegible] (the first edition in English was published in 1775) unequivocally proves:—"Any fever (says Dr. Marryat) may be soon extinguished by the use of the following powders:—Take of tartarized antimony five grains, white sugar (or nitre) a drachm; let them be well rubbed in a glass mortar, and divided into six powders; one to be taken every three hours, notwithstanding the nausea the first may possibly occasion. If these are taken (which is commonly the case) without any manifest inconvenience, let there be seven grains in the next six powders; and in the next ten. Here I beg to retract what I said in some former edition of this work, viz. that till sickness and vomiting were excited, this noble medicine was not to be depended upon. For I have since seen many instances wherein a paper has been given every three hours (of which there have been ten grains in six powders,) without the least sensible operation, either by sickness, stool, sweat, or urine, and though the patients had been unremittedly delirious for more than a week, with subsultus tendinum and all the appearances of hastening death, they have perfectly recovered without any medical aid, a clyster every other day excepted. I have lately seen a great many cases similar to the above, and the tartarized antimony has invariably produced the same effect."—*Transl.*

power even in doses of thirty grains. They are supported with more difficulty than even the emetic tartar. I prefer to them the white oxyd of antimony, which may be carried to the extent of four or five drachms per day, but without being, even in this dose, of very decided power.

Regimen in pneumonia.—In the acute stage of severe pneumonia, the patient ought to be debarred from every kind of aliment except sugar and the mucilaginous matters which enter into the composition of his drinks. As soon, however, as the inflammatory action has subsided, he must be allowed some slight food, to be increased as the appetite returns. In general we ought, in all diseases, to be afraid of carrying the complete inhibition of food beyond a few days. Many physicians of the present day seem to have, in this respect, forgotten the wise precepts of Hippocrates (Aph. 16 et seq. sect. i.) who lays down in a few aphorisms all that can be truly and exactly predicated of abstinence. Some even seem to be ignorant that a sick man may die of starvation as well as a healthy one; and appear to have no idea that the symptoms resulting from inanition are, in a great measure, similar to those of the various stomach affections, which they consider as gastritis. The great and most frequent evil of extreme abstinence in acute diseases, is to create such an irritability of stomach, as renders the nourishing of the patient, after the fever has subsided, extremely difficult, and thereby occasions a long and dangerous convalescence.* Too great heat, produced by too much covering or defective ventilation, is extremely prejudicial. When this is observed, we need not be afraid to uncover the patient for a few minutes, and expose him to a cooler air. Some authors have recommended bathing in this disease. I have little experience of this mode of treatment, which must be very inefficient in an affection like this.

I shall conclude this chapter with a case of pneumonia ending in resolution. I would gladly have added a case of chronic pneumonia, but the history of the most remarkable of these has been lost.

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* It is possible, no doubt, to carry the best practice to an injurious extreme; and we may unquestionably starve our patients, as well as stimulate them into disease. At the same time, I am convinced by every day's experience, that for one instance of mischief produced by too great abstinence in the convalescence from acute and especially inflammatory diseases, there are a thousand occasioned by the opposite extreme; and I would, therefore, earnestly request the young practitioner not to be seduced into the too early exhibition of nutritive food to his convalescents, from fears of dangerous debility, or any other cause. What Broussais says in respect of bloodletting, is equally applicable to abstinence, and I would advise the student to treasure the great pathological truth contained in the following sentence, as containing in itself more real practical utility than is to be found in many splendid theories. "Ce ne sont point les pertes de sang qui prolongent les convalescences; ce sont les points d'irritation qui restent dans les visceres; et souvent les stimulants et les pretendus toniques que l'on s'empresse de prodiguer, afin de reparer les forces que l'on vient d'enlever par la saignée, contribuent à entretenir ces foyers chroniques de phlegmasie, et à rendre le retablissement plus difficile." (*Examen des Doct. Med.* p. 503.)—*Transl.*

Case XVI. *Disease of the heart.—Double pneumonia (in a state of resolution,) with partial pleurisy.* A man twenty-two years of age, who had suffered, during the five preceding years, from continual dyspnœa and a very frequent palpitation, came into the hospital on the 29th March, 1825. He gave a very imperfect account of his complaints, but it appeared that they supervened to an acute attack of fever accompanied by bilious vomiting and pains in the abdomen. He had likewise been subject, from his childhood, to frequent fainting-fits, which sometimes lasted, according to his account, ten or twelve hours; but these attacks had ceased about the age of puberty. The following was the state of his symptoms on his admission: very considerable dyspnœa; respiration good and *pure* anteriorly, accompanied by an obscure mucous rhonchus posteriorly; palpitations; action of the heart preternaturally quick, sensible to the touch, yielding on the right (that is, under the lower part of the sternum,) a strong impulse and a very considerable sound, and on the left, a feebler impulse but louder sound. Diagnosis: *hypertrophy with dilatation of the heart, particularly on the right side; pulmonary catarrh. (V. S. to* 12 *oz.; barley water; a scruple of digitalis in infusion, with a mucilaginous mixture; two grains of acetate of lead.) April* 11. Better. Pulse which had been rather frequent, more natural; action of the heart sensibly less. Pains in the feet, but without redness or swelling. Diagnosis: *hypertrophy of the right ventrical certainly exists, but it is not sufficient to account for all the symptoms.* 19th. Has had sore throat during the last two days, for which twelve leeches have been applied with relief. There is now a slight pain of the left side of the chest, accompanied by a pretty strong sibilous rhonchus, intermixed with a subcrepitous mucous one, at the roots of the left lung, and mucous expectoration. *(Same med.: emollient gargle.)* 25th. Since the day before yesterday there has been present a pretty high fever, but without any local pain or much general disturbance of functions. The impulse of the heart is much stronger than before. The same rhonchus exists at the roots of the left lung. *(V. S. to eight ounces. Same med.*[*]) 26th. The fever continues with dyspnœa; the expectoration is somewhat viscid, but without any evident pneumonic character. There is no pain in the chest, which sounds well posteriorly. Respiration pretty good on the right back, with a slight subcrepitous rhonchus at the root of the lung,—weaker on the left back and attended by a distinct crepitous rhonchus: no bronchophony. Diagnosis: *double pneumonia—slight on the right side, more considerable on the left. (V. S.*[*] *to eight ounces): almond emulsion with six grains of emetic tartar; mucilaginous mixture; broth, (bouillon).*[†] 27th. Fever and dyspnœa somewhat less: repeated vomiting and great diarrhœa; expectoration rusty, mixed with large air-bubbles. The chest sounds somewhat imperfectly on the left back, and there is a subcrepitous, mixed here and there with a mucous rhonchus over the whole of this side; and there is also a subcrepitous rhonchus in different points over the whole of the right back, and even on the side: Diagnosis; *lobular pneumonia of the posterior parts of both lungs, especially the left,—the inflammation having extended to a great many points. (Six grains of emetic tartar in an emulsion, with an ounce of syrup of poppies; mucilaginous mixture; abstinence from all kinds of foode (diete.)* 28th. General symptoms the same; no vomiting or diarrhœa; pulse and heart still preternaturally strong; great dyspnœa; crepitous or subcrepitous rhonchus over the whole left side, except on the upper part anteriorly, and also over the whole right back, and slightly on the side (same med.; V. S. to eight ounces.) Diagnosis: *The inflamed points unite; the pneumonia approaches the surface.*—29th. Fever and dyspnœa still great; several stools but no vomiting; expectoration no longer rusty and viscid, but white, light, yellow, opaque, and almost puriform. Chest in the same state, except that the crepitous rhonchus now approximates in character to the mucous. The hand placed on the chest perceives the vibration of the sputa within the bronchi. *(Emetic tartar nine grains, syrup of poppies two ounces.)* Diagnosis: *the expectoration indicates incipient suppuration, in some points at least.*—30th. Fever and prostration; dyspnœa increased; expectoration more difficult, sputa almost as white as if they were coloured with milk; sore throat and coryza considerable; no vomiting, but five stools within the twenty-four hours; respiration every where pretty good on the right side, only with a crepitous rhonchus towards the roots of the lung,—better also on the left, but still accompanied on the back by a crepitous rhonchus mingled to-day with a strong mucous one; slight bronchophony on the left side. (Same med.: V. S. to eight ounces.) Diagnosis: *resolution commences on the right, and also on the left side; but in the latter, there is still one point much indurated, near the surface of the lung, on the side.* The patient died the following day.

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[*] The existence of the subcrepitous rhonchus at the roots of the lungs was of itself no proof of inflammation, as it is common in subjects with disease of the heart. Suspicion was now excited as to pulmonic inflammation, and bloodletting was prescribed under apprehension of incipient pneumonia.—*Author.*

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[*] The bleeding was repeated on account of the disease of the heart, the presence of which has always appeared to render the tartar emetic less efficacious in pneumonia.—*Author.*

[†] An extremely weak decoction of veal or chicken, I presume; or perhaps simply of herbs. The *bouillon de veau* of La Charité is made with four ounces of veal to two pounds of water.—*Transl.*

Dissection twenty-four hours after death.—There was some serous effusion under the membranes, and also in the ventricles of the brain, which had no doubt taken place during the last twenty-four hours, and most likely in a great measure during the few last moments of life. The right lung was found intimately adhering to the costal pleura, by short and very firm old cellular attachments. It was large, somewhat flabby, and although crepitous, was evidently heavier, and more compact and elastic than natural. Divided longitudinally through its whole mass, it was found of a yellowish red pale colour, intermixed with shades of very light ash-grey. It was almost as dry as in the sound state, but yielded on pressure a slightly yellowish and somewhat frothy serosity. Its vessels contained little blood. At its roots and lower and back parts, there were some points or nodules of a redder colour, more dense and compact, and exuding a bloody serum. These nodules were for the most part confined to single lobules, but comprised in some places two or three; they were not accurately circumscribed, nor uniformly indurated. The greater number were harder in the centre, and exhibited there the *granular* texture of pneumonia and a redness more or less violet: towards their exterior, they passed insensibly through a shade of violet-grey to the reddish yellow colour of the natural tissue. The portions which were violet-grey were injected with a pretty large quantity of frothy serum, and had nothing of the granular texture. In other points of the lungs a good many nodules existed of the same violet-grey colour throughout, without any central induration; these were of the size of lentils, or at most double this size, and occupied the middle of the lobules.* The left lung was also united to the pleura, but less firmly than the right. On the anterior-inferior and lateral parts there was, in one place, about the size of the hand, an exudation of concrete pus and serosity like whey, within the meshes of the cellular adhesions.† The pulmonary substance presented two different states: anteriorily and superiorily, it was nearly natural, and somewhat more elastic, firmer, and more compact than the sound lung.‡ Over three-fourths of the posterior portion, it was still more dense and compact, as elastic, but less crepitous. Over this space, the whole pulmonary substance was of a pale wine-lees colour, or slightly violet, which formed a marked contrast with the reddish colour of the anterior parts. It exuded on pressure a small quantity of yellowish and somewhat frothy serum, intermixed with small granules or dots of a puriform fluid. Some pneumonic nodules, still red and granular in their centre, existed at the roots and base of the lung behind. In every other part behind, the vesicular texture was perceptible, even in the redder and denser portions disseminated through it. Both lungs, although elastic and crepitous over the greater part of them, were much heavier than natural. The bronchial membrane was every where red; and this colour extended, though in a less degree, to the trachea and larynx, which were otherwise perfectly sound. The heart was equal in size to two fists of the individual. The left ventricle was large and its walls thin; the right was of the natural dimensions, perhaps somewhat larger, and its walls were almost as thick as those of the left. The right auricle was covered externally by a great many small cartilaginous granulations, of the size of half a millet or hempseed, and situated beneath the serous membrane.*

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* These characters indicated the resolution of a lobular pneumonia, which had in these points, reached the stage of hepatization. The weight and density of the parts that were still crepitous, proved that these had been *engorged*, and were not yet completely in a state of resolution.—*Author.*

† This is an example of partial pleurisy developed amid an ancient pleuritic cellular tissue. The albuminous exudation in this part was the cause of the bronchophony observed on the 30th April.—*Author.*

‡ A mark of resolution where the pneumonic affection had probably not reached beyond the first stage.—*Author.*

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Transl.

CHAPTER VII.

OF TUBERCLES IN THE LUNGS, OR PHTHISIS PULMONALIS.

THE progress of pathological anatomy has successfully demonstrated that phthisis pulmonalis is owing to the development in the lungs, of a particular species of *accidentical production*,* to which modern anatomists have restricted the name of *tubercle*, a term formerly applied to every kind of preternatural tumour or protuberance. This, I think, is the only kind of phthisis which we should admit, unless, indeed, it were the *phthisis nervosa* and the chronic catarrh stimulating tuberculous phthisis. The varieties termed *scorbutic*, *venereal*, &c. are all essentially tuberculous, differing only from the common species by the cause (perhaps gratuitous) to which the development of the tubercles is attributed. In respect of the species described by Bayle under the name of *granular*, *ulcerous*, *calculous*, *cancerous* and with *melanosis*, I may here remark, that the first is a mere variety of the tuberculous; the second is the partial gangrene of the lungs, formerly described; and the three others are affections which have nothing in common with the tuberculous phthisis, except that they have their seat in the same organ.

The progress of the development of tubercles has been described by Bayle in a much more exact and complete manner than had been done before him.† Nevertheless, from having been enabled by more recent observations to rectify or extend several of his, I deem it essential to the comprehension of what I shall have to state, to give, in this place, an abridged exposition of the characters and mode of development of tubercles, for which I might otherwise have contented myself by a reference to his work.

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* Under the term *accidental productions*, I comprehend every substance foreign to the natural organization of a part, which any aberration in the nutrition may develop in our organs. These various substances may be divided into two classes according as they are, or are not, analogous to some of the natural textures of the body. Under the first head we may range all productions of a cellular, serous, mucous, fibrous, bony, &c. character; under the second, all the varieties of cancer. In the following chapters I shall only treat of those accidental productions which I have myself had occasion to observe in the lungs. These are: 1. Cysts, properly so called; 2. cysts, containing vesicular worms, or hydatids; 3. substances of a fibrous, cartilaginous, bony or chalky nature; 4. tubercles; 5. that species of cancer denominated *encephaloid* or *cerebriform*; and 6. that other variety of cancer which I have termed *melanosis*. I will treat of *tubercles* in the first place, because what I shall have to notice respecting this variety of accidental production, will tend to illustrate the history of the other varieties.—*Author*.

† Recherches sur la Phthisie pulmonaire. Paris, 1810.

SECT. I. *Anatomical history of tubercles.*

The matter of tubercles may be developed in the lungs, or other organs, under two principal forms,—that of *insulated bodies* and *infiltration.* Each of these presents several varieties, chiefly referrable to the different degrees of development. The insulated tubercles present four chief varieties which I shall denominate *miliary*, *crude*, *granular* and *encysted.* Tuberculous infiltration offers in like manner three varieties, which I term *the irregular*, *the grey* and *the yellow*. Whatever be the form under which the tuberculous matter is developed, it presents at first the appearance of a grey semi-transparent substance, which gradually becomes yellow, opaque, and very dense. Afterwards it softens, and gradually acquires a fluidity nearly equal to that of pus; it being then expelled through the bronchi, cavities are left, vulgarly known by the name of *ulcers of the lungs*, but which I shall designate *tuberculous excavations.* I shall describe the different varieties in succession.

Miliary tubercles.—This is the most common form under which the tuberculous matter appears in the lungs. The tubercles in this variety resemble small grains; they are of a grey colour, and semi-transparent, sometimes even transparent and colourless, and of a consistence somewhat less than that of cartilage. Their size varies from that of a millet to that of a hemp-seed. Their shape roundish at first sight, is found, on inspection, to be less regular when examined closely and with a lens; they sometimes even appear somewhat angular. They adhere intimately to the pulmonary substance, insomuch that they cannot be detached without bringing with them some portions of it. They grow by intus-susception, and thus become united in groups. Before this union, however, a small yellowish opaque speck appears in the centre of each tubercle;* this speck gradually enlarges and finally involves the whole tubercle. Very frequently the tubercles coalesce before their whole substance undergoes the change just mentioned; and in this case, when we divide one of the masses formed by the union of several, we can regularly recognize the small yellow points, indicating the centres of the respective tubercles, and the zone of unchanged grey matter surrounding these. After a certain time, the conversion of the whole into this yellow matter is completed, and the group then constitutes only a single homogeneous mass of a whitish yellow colour, and of a texture somewhat less compact and moister than that of cartilage: it is then said to constitute the *yellow crude tubercle* or simply the *crude tubercle.* When the miliary tubercles are a little distant from each other, they frequently reach this stage without coalescing, and while they are still only of the size of millet seed. When the tubercles are very few in number, for example, a hundred only in each lung, they sometimes singly acquire the size of a cherry-stone, a filbert, and even an almond. They very seldom exceed this last size; and the larger tuberculous masses are usually either the product of several tubercles united, or of the tuberculous infiltration. In general, we consider it a sign that the isolated tubercles have originated in a single point or granule, when we find them retaining their primitive roundish or ovoid shape.

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* Andral says (Clin. Med. t. iii. p. 5) that the speck does not always appear first in the centre, but sometimes even on the surface.—*Transl.*

The pulmonary tissue around the miliary tubercles is usually perfectly sound and crepitous, and this the more so according as they are small in size and of recent formation.

Granular tubercles, or miliary granulations.—This rare variety of tubercle was described for the first time by Bayle, and on account of its very peculiar character, was considered by him as an accidental production different from that of tubercles. These granulations are nearly of the size of a millet seed; they are exactly round or ovoid, and differ still further from common tubercles by the uniformity of their size, their want of colour, and their transparency. They are commonly disseminated in countless numbers over the whole extent of one lung, or a great part of it, without being at all found to coalesce in groups. Sometimes, however, from their vast number and proximity to each other, they constitute solid masses or nodules; but when they are cut into, we find the granulations all distinct and separated from each other by cellular substance, which is either quite sound, or, at most, only slightly injected with serum. Bayle was evidently mistaken in considering these granulations as different from tubercles, and, still more, in regarding them as accidental cartilages. (Op. Cit. p. 48.) Had this latter opinion been well founded, we should sometimes see them pass into the state of bone, which is never the case. On the contrary, if we examine these bodies attentively, we shall be convinced that they pass into yellow and opaque tubercles. Even when they are most transparent and colourless, we find some of them with an opaline or slight greyish tint, which assimilates them with the common tubercles. In cutting into these we find their centre yellow and opaque, a sufficient proof of their incipient transformation into the yellow crude tubercle.* Bayle himself (obs. iv.) cites a remarkable instance of this. We find also, in other cases, in lungs filled with tubercles, all very small, and equal sized, but yellow and opaque, and sometimes, in a well-marked state of softening. Bayle (obs. xvi.) gives an instance of this also; and although he warns us not to confound these miliary tubercles with the *granulations*, it appears to me clear, that the only difference between them is that which exists between a ripe and a green fruit. Besides, these miliary granulations are never met with except in lungs in which there exist at the same time other tubercles of a larger size, and sufficiently advanced to render their character no longer matter of question. The development of tubercles in other organs presents, also, a series of facts sufficient to prove, that in their first state and when recent, they are always diaphanous or semi-transparent and colourless, or of a slight grey colour. On the surface of the pleura and peritoneum, they are sometimes colourless and quite transparent, at other times grey and only semi-transparent. In both cases they have often an opaque yellow point in the centre; and sometimes we even find them converted into tuberculous matter more or less softened. It is by no means rare to observe all these different stages on the same membrane. In the intestine ulcers of phthisical subjects we commonly find miliary tubercles, with the same variety of colour and transparency. Around the tubercles which are found in lymphatic glands, we also observe a slight semi-transparency and a pearl-grey tint, indicative of the approaching complete transformation of the gland into tuberculous matter. Finally, Bayle found the spleen filled with small greyish bodies, which he himself regarded as tubercles. (Obs. xii.)* Bayle's error in respect of these granulations arose from his not having sufficiently distinguished the grey and semi-transparent matter which constitutes tubercles in their early or crude state. Several of his cases, however, particularly the 6th, 12th, 13th, and 24th, show that he observed this, but without ascertaining the relation which it bears to the yellow and opaque tubercles. It is moreover worthy of remark in this place, that all the accidental productions which have no analogy with the natural textures of the body, in their earliest stage, present the same semi-transparency, and are equally hard, with the single exception of melanosis. May we conceive that this *lardaceous* matter, as it was called by the ancients, so little varied in the different accidental productions, may be for them what the yolk of the egg is to the chick, and the primitive animal jelly to the organs formed in it,—viz. a sort of a matrix destined to receive materials foreign to the natural organization of the part, the consequence of some aberration of nutrition?

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* Bayle's opinion, as far as relates to the difference of granulations and tubercles, but not as to the former being of a cartilaginous nature, is maintained by [illegible] [illegible] [illegible] writers [illegible] says, that the granulations [illegible] and Andral says, [illegible] that they never give rise to large tuberculous excavations [illegible] however, a much higher authority on this point, [illegible] agrees with Laennec.—*Transl.*

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* MM. Andral and Chomel were the first to deny this identity of granulations in other organs with those in the lungs; the former endeavouring to prove that the pulmonary granulations were merely the air-cells indurated and hypertrophied, (Clin. Med. t. iii. p. 5,) the latter giving no reasons for his opinion (Dict. de Med. t. x. art. *granulation*). M. Andral says, these apparent granulations are only met with on the free surfaces of the serous and mucous membranes, and are, in the former case, the rudiments of false membranes, and in the latter hypertrophied follicles (*Precis. d'Anat. Path*, t. i. p. 411.) In opposition to these opinions, I would adduce the facts (1) that granulations are met with in intestinal ulcers with complete destruction of the mucous membrane; (2) that those met with on the surface of serous membranes are always deposited in false membrane. Adopting the hypothesis of M. Andral, we must therefore admit that mucous follicles may exist without mucous membrane, and that the rudiments of false membranes may be enclosed within other false membranes.—(*M. L.*)

Independently of the stages of development above mentioned, certain accidental circumstances may change the colour of tubercles. Jaundice stains them yellow, particularly on their surface; and this is especially the case when they are situated in the liver. Gangrene in their vicinity gives them a brownish or dirty brown colour. The black pulmonary matter sometimes stains them partially, intermixing some black or grey points with their yellowish white. It is even probable that the grey colour of the tubercles in their first stage of crudity and transparency, is owing, at least in part, to an admixture of a small portion of the same black matter. I have thought that I had observed in the cases where the miliary granulations were most transparent, the quantity of black pulmonary matter in the lungs was the least. The miliary tubercles, moreover, whether semi-transparent or opaque, have a black point in their centre, which usually disappears as they enlarge. I formerly remarked, when treating of the bronchial glands, that the tubercles which form in them, have often in their interior a dash of black, like the shading of a crayon drawing, very deep in some points, and gradually vanishing as we recede from these.

Grey tuberculous infiltration.—This kind of infiltration is frequently formed around tuberculous excavations. We sometimes also find it existing primitively in cases where no tubercles exist: but this is extremely rare. In other cases, we find tuberculous masses of a large size, in the first or semi-transparent stage, without any previous development of miliary tubercles. These masses are dense, humid, quite impermeable to air, and of a more or less deep grey colour. When cut in thin slices, they are found to be almost as compact as cartilage, with a smooth and polished surface, and a homogeneous texture, in which the vesicular structure of the lungs is no longer perceptible. In proportion as they advance towards softening, we observe a quantity of small yellow opaque specks make their appearance, which, gradually increasing in number and size, at length involve the whole mass, and convert it into yellow tuberculous matter. This species of grey tuberculous infiltration has been, of late years, mistaken by inexperienced observers, for chronic pneumonia. We shall presently notice the anatomical characters by which this degeneration differs from inflammation.

Jelly-like tuberculous infiltration.—In the intervals of the miliary tubercles we very frequently observe an infiltration, usually of small extent, of a matter which may be said to be very humid rather than fluid, which is colourless, or slightly sanguineous, and has more the appearance of a fine jelly than of common serosity. We might be tempted in some instances to consider this as mere œdema, formed by a very viscid lymph, were it not that we can distinguish, with great difficulty, or not at all, the natural alveolar structure of the lungs amid the gelatinous mass. By degrees, this substance acquires greater consistence, and is gradually and insensibly transformed into the tuberculous matter which I have beeen describing above. Where this substance is most transparent and fluid, we frequently observe in it small yellow points, evidently of a tuberculous character, and finally, we trace it through all the stages of the common tuberculous degeneration. For these reasons, I consider this jelly-like substance as a mere variety of the semi-transparent grey tuberculous matter; although it also, like the last variety, has been recently mistaken for a product of chronic inflammation. The conversion of the grey and gelatinous infiltration into yellow tuberculous matter, is sometimes so rapid, that in examining lungs, containing very large masses of the latter, we sometimes find no trace of the former, although there can be no doubt that the one originated in the other. This form of the tuberculous infiltration is found in different points of the lungs, in masses of a yellowish white colour, and much paler, duller, and less distinct from the substance of the lungs than the common crude tubercles. These masses are irregular, angular, and never have the nearly round shape of ordinary tubercles. Like the variety described in the last paragraph, and the diffused grey matter formerly noticed, they appear to be produced by a kind of infiltration of the tuberculous matter into the pulmonary tissue; whilst the common round tubercles are foreign bodies, which separate and press aside the substance of the viscus, on all sides, rather than penetrate into its parenchyma. These masses occasionally occupy a considerable part of one lobe, without at all altering its shape, or producing any protuberance on its surface. In their progress they become first yellow, and finally soften like common tubercles.[*]

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[*] M. Laennec's views regarding the primary state of tubercles and the mode of their development, has been called in question by various pathologists. Indeed the researches of Majendie (Jour. de Med. t. i. 1821); of Cruveilhier (Med. Eclairée, &c. *Par.* 1821; Nouv. Bib. Med. *Sep.* et *Nov.* 1826); of Andral (Clin. Med. t. iii.; Dict. de Med. t. xvi. art. *Phthisie*, t. xx, art. *Tubercle.*; Precis d'Anat. Path.); of Lombard (Essai sur les tubercles, *Par.* 1827); and of Boulland (Recherches sur les Tiss. sans analog. Journ, des Progr. t. iv. 1827); all tend to establish the proposition, that *tubercle*, instead of being an accidental production possessing a proper vitality, and developing itself by *intus-susception*, like organized tissues, is, in fact, the result of a morbid secretion—a peculiar species of pus—an inorganic product formed by *juxtaposition*; the tubercle is in the first instance liquid, but speedily concretes under the form of minute rouned grains, which are friable, opaque,

In whatever manner the crude tubercles are formed, after a very variable period of time they finally become soft and fluid.

yellowish, isolated or in groups, encysted or free, and which, after a certain time, assume once more the liquid form, or become, at least, soft; that in place of the softening process proceeding regularly from the centre to the circumference, it is found to commence at any point indifferently, the liquefaction being the consequence of a fresh purulent secretion occasioned by the presence of the tubercle acting as a foreign body; that there is no such thing as a distinct *grey* tubercle,—what has been mistaken for this being a mere variety of chronic inflammation, a simple hypertrophy of the natural tissues, *within which* true tubercle is frequently developed, but by no means as a necessary consequence; that the tubercular secretion, like every other secretion, takes place under the influence of an active sanguineous congestion, and may, like that of pus, succeed to a local inflammation or a mechanical irritation, but that it occurs more commonly in consequence of a general predisposition, congenital or acquired, and which predisposition seems, in its turn, to be the result, at least most frequently, of an altered condition of the fluids; finally, that the cellular tissue is the most common, if not the exclusive site of the tuberculous secretion.

I cannot here detail the facts, more or less questionable, upon which this very specious theory of *tuberculisation* rests, which, by the way, is fundamentally a mere paraphrase of that of M. Broussais. I will only remark, that if we reject the existence of the *grey* tuberculous matter, and regard the phenomenon as a simple hypertrophy of the tissues, the consequence of a chronic inflammation, we must, at least, admit that this hypertropy *necessarily* precedes the development of the yellow tubercles, or else we must reject one of the most legitimate deductions in pathological anatomy; we must further admit (what appears to me in opposition to all just observation) that a tissue, in simply augmenting its volume, may become so altered in form as to retain no trace of its primitive organization.

Other observers, without rejecting all that Bayle, Laennec, Louis, and others, regarded as established, have advanced the opinion that the grey is not the first but the second stage of the yellow tubercle, being preceded by a red or reddish yellow body of the size of from one fourth to a whole millet seed, pretty solid and resisting being flattened under the nail without any escape of fluid, and attached to the surrounding tissue by a mass of cellular or vascular filaments constituting a sort of *tomentum*, or down around them. According to M. Rochoux, who has most carefully described these bodies, although they had beenp reviously noticed by Dal[illegible] (*Ripet. di Medic. &c.* Nov. 1826,) the grey tubercle first begins to show itself at their centre, in the same point where the subsequent softening of the yellow tubercle commences. The tomentose or downy envelope of these nascent tubercles (which present no traces of organization) uniting them, as by radicles, to the tissue in which they are developed, indicate them as being the result of an organic process, by means of which the primary form of the particular tissue has been made to disappear at the same time that the new materials have been incorporated with it; in other words, that there has been a real removal of tissue, and not a mere displacement of it. (*Bull. Univ. des Sc.* Août. 1829.) M. Rochoux is disposed to conclude from his researches that tubercle is neither an accidental production nor a secreted matter, but a *degeneration* or transformation of a healthy tissue into a morbid one. This, then, is a third theory of tuberculisation quite as specious as the last.

A fourth theory, not mentioned by Laennec, although he was well acquainted with it, is that of Dr. Baron, who contends that all tubercles are in their origin transparent vesicles or hydatids. (*On the nature of Tuberculated Accretions, &c.* Lond. 1819; *Illustrations of the Enquiry respecting Tuberculous Diseases.* Lond. 1[illegible]) This opinion is evidently that of a man little versed in the researches of pathological anatomy, and more conversant with slaughterhouses than dissecting rooms, who has not been able to discriminate the distinctive progress and development of each of two morbid alterations frequently co-existing. There is only one professed anatomist who has appeared to adopt this opinion of Dr. Baron, and it is remarkable that he is one whose researches have been more in comparative than human anatomy. (*Dupuy.* De L'Affect. Tuberc. vulg. appelée *Morve*, &c. Par. 1807.) M. Dupuy has, however, been very reserved in stating his opinions, contenting himself with saying, that he has found tubercles and hydatids co-existing in the same subjects, and often in the same viscus, and that he has sometimes seen in the [illegible]

The process begins in the centre of each mass, and gradually increases, the tuberculous matter becoming daily softer and moister, cheesy, at least unctuous to the touch like soft cheese, and finally acquires the viscidity and fluidity of pus. The softening gradually attains the surface, and at last involves the whole mass.

In this stage the tuberculous matter is of two different kinds in appearance;—the one resembling thick pus, but without smell, and yellower than the crude tubercle; the other, a mixed

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which contained hydatids incipient deposits of tuberculous matter, *a circumstance which would lead us to imagine that the one might succeed the other.*—(*M. L.*)

The last writer on the subject of Tubercle, and one whose talents, industry, and most extensive opportunities, entitle his authority to the greatest consideration, is Dr. Carswell; and I shall conclude this note with a brief notice of his opinions, as recorded in the first fasciculus of his invaluable work on Pathological Anatomy; and in the article *Tubercle* in the 4th volume of the Cyclopædia of Pract. Med. It will be seen that they accord, in some respects, with those of Andral, and Cruveilhier, and Lombard, but differ in others. 1. The *seat* of tubercle may be any of the tissues, but the *mucous* tissue is by far its most frequent depository. 2. The *form* of tubercle is entirely dependent on the condition of the parts where it is deposited: it more commonly affects the rounded form, because the equal pressure of contiguous parts in certain localities naturally tend to produce this shape. 3. The *consistence* of tubercle varies with the period of its existence, the relations of the surrounding parts, &c.; at its first deposition it is often fluid, or of the consistence of soft cheese intermixed with water. 4. The *grey semi-transparent* condition of tubercle is by no means a necessary precursor, as Laennec imagines, of the yellow tubercle, as this condition is only observed in a few of the many organs where yellow tubercle is found. The following quotation will at once explain Dr. Carswell's view of the manner in which tuberculous matter is secreted generally, and his manner of accounting for the peculiar character of one form of the pulmonary tubercle:—"It is obvious that a healthy secreting surface may separate from the blood not only the materials of its own peculiar secretion, but also those of tuberculous matter. Such is, indeed, what takes place in the air-cells. The mucous secretion of their lining membrane accumulates where it is formed; but it is not pure mucus; it contains a quantity of tuberculous matter mixed up with it, which, after a certain time, is separated, and generally appears in the form of a dull yellow, opaque point, occupying the centre of the grey, semi-transparent, and sometimes inspissated mucus." 5. Tubercle is completely inorganic and incapable of alteration except from external agency: *softening* therefore takes place from the effect of the pus, &c. secreted around it: this process consequently commences commonly at the surface. The following is the explanation given by Dr. Carswell of the mistake made by Laennec as to the commencement of softening in the centre:—"When tuberculous matter is formed in the lungs, it is generally contained in the air-cells and bronchi. If, therefore, this morbid product is confined to the surface of either, or has accumulated to such a degree as to leave only a limited central portion of their cavities unoccupied, it is obvious that when they are divided transversely the following appearances will be observed: 1. A bronchial tube will resemble a tubercle having a central depression or soft central point, because of the centre of the tube not being, or never having been, occupied by tuberculous matter, and because of its containing a small quantity of mucus or other secreted fluids; 2. the air-cells will exhibit a number of similar appearances or rings of tuberculous matter grouped together and containing in their centre a quantity of similar fluids. When the bronchi, or air-cells, are completely filled, the tuberculous matter presents no such appearance; and hence the reason why tubercle, in such circumstances, has been said to be still in the state of *crudity*, or that condition which precedes the softening process." (*Pathol. Anat. Fasc.* I.) 6. The term *encysted* is almost always incorrect: in the lungs, it is generally the distended walls of the air-cells which have been mistaken for cysts. 7. The *cure* of pulmonary tubercle by cicatrization, as explained by Laennec, is fully corroborated by the observation of Dr. Carswell.—*Transl.*

fluid, one portion of it being very liquid, more or less transparent, and colourless, unless tinged with blood, and the other portion opaque, of a caseous consistence, soft and friable. In this last condition, which is chiefly observable in strumous subjects, the fluid often perfectly resembles whey having small portions of curd floating in it. When the softening of the tuberculous mass is completed, this finds its way into some of the neighbouring bronchial tubes; and as the opening is smaller than the excavation, both it and the latter remain, of necessity, fistulous, even after the complete evacuation of the tuberculous matter. It is extremely rare to find only one such excavation in a tuberculous lung. Most commonly the cavity is surrounded by tubercles in different stages of their progress, which, as they successively soften, discharge their contents into it, and thus gradually form those irregular and continuous excavations so frequently observable, and which sometimes extend from one extremity of the lungs to the other. Bands, composed of the natural tissue of the organ, condensed, as it were, and charged with the tuberculous degeneration, frequently cross these cavities, in a manner something resembling the *columnæ carneæ* of the ventricles. These bands are of less dimensions in their middle than at their extremities, and have often been mistaken for vessels. M. Bayle himself seems to have fallen occasionally into this error, since he says, that vessels *frequently* traverse such cavities; whereas this is, in my opinion, a very rare circumstance. Nay more, I have never even found a vessel of any consequence included within the substance of these bands. Neither is there any example of this in M. Bayle's work; and I only remember to have heard him mention one case where this took place, viz. in a fatal hæmoptysis, where the ruptured vessel was found crossing a very large cavity. In the very few cases where I have found blood vessels in such bands, they constituted only a small portion of their mass, and were, for the most part, obliterated. Generally, indeed, they can only be traced for a small space into these columns, being soon undistinguishable from the pulmonary tissue injected with the tuberculous substance.* It would appear that the tubercles, during their increase, press on one side, and separate the blood vessels, as we find these, sometimes of considerable size, lining the internal surface of the cavities, and forming a part of them. These vessels are generally flattened, but rarely obliterated: their smaller ramifications, however, which stretch towards the tuberculous excavations, or towards unevacuated tubercles, are evidently so, as is proved by our abortive attempts to throw an injection through them into the excavations. Dr. Baillie had already made the same observation; and Dr. Stark appears to have found these vessels obliterated by coagulated blood.* The ramifications of the bronchi, on the contrary, seem rather enveloped than pressed aside by the tuberculous matter; and it would appear that the pressure soon obliterates their canal, as they are hardly ever to be detected in the morbid substance. That they must, nevertheless, have originally traversed the spaces now occupied by the tubercles, seems proved by the fact, that in every excavation, even the smallest, we find one or more bronchial tubes opening into it. These tubes scarcely ever open sideways, but are cut directly across, on a line with the internal surface of the excavation; and their direction is such as shows them to have originally crossed this space.

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* Louis (Op. Cit. p. 12) says he has only met with five cases in which vessels were discoverable in these bands.—*Transl.*

In proportion as an excavation discharges its contents, its walls become covered with a species of morbid or false membrane, thin, smooth, white, nearly quite opaque, of a very soft consistence, and almost friable, so that it can readily be scraped off with the scalpel. This membrane is generally quite perfect, covering the whole internal surface of the cavity. Sometimes, in place of that just described, we find a membranous exudation, thinner, more transparent, less friable, more intimately connected with the walls of the cavity, and, for the most part, lining these only in part. When completely investing the cavity, it presents, in different parts of its surface, points here and there of greater prominence, as if the exudation had begun in these different spots at the same time. Frequently we find this second membrane beneath the first, which last is then quite loose, and lacerated in several places. Occasionally, also, both these membranes are entirely wanting, and the walls of the cavity are formed directly by the natural tissue of the lungs, which, in this case, is commonly condensed, red, and charged with tuberculous matter in different stages of its development.

From these facts it appears to me that the second species of false membrane just mentioned, is only the first stage of the first species; and that when this is fully formed it is apt to be detached, and discharged in a greater or less degree,—forming one portion of the sputa expectorated by the consumptive. Bayle thinks that this false membrane secretes the pus expectorated in this disease: an opinion which is founded on the analogy existing between it and that which forms on the surface of blisters and ulcers. It seems certain, however, to me, at least, that the greater part of the matter expectorated is the product of the bronchial secretion, augmented as this is by the irritated condition of the lungs. I do not assert that pus is not formed in these tuberculous excavations at all, but I certainly have observed, that when these are lined by the soft membrane described above, they are often entirely empty, and that when they do contain any puriform matter, this bears by no means so great a resemblance to the sputa, as that does which is contained in the bronchi.

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* I think it due to the memory of Dr. Stark to state, that he noticed and accurately described the early appearance and progressive development of tubercles in the lungs, long before they attracted the attention of the French pathologists. See the extract from his MS. read before the *Society for promoting Medical Knowledge*, January 13, 1784, and published the same year in the first volume of the "*Medical Communications*," p. 359. The best previous account of tubercles, are those by *Wepfer* (Miscel. Cur. vol. xix.) and *Desault* (Sur les Mal. Vener, &c Bordeaux, 1733.)—*Transl.*

If the disease remains long stationary, there are at length developed, in different points under this false membrane, patches of a greyish white colour, semi-transparent, of a texture like that of cartilage, but somewhat softer, and adhering closely to the pulmonary tissue. These patches coalesce as they grow in size, so as eventually to form a complete lining to the ulcerous excavation, and this lining seems to form one continuous surface with the internal coat of the bronchial tubes which open into it. When this cartilaginous membrane is completely formed, it is commonly white or of a pearl-grey; or it has a slight reddish or violet tint, which latter colour is derived from the colour of the subjacent tissue being seen through it. Sometimes, however, even when the membrane is of considerable thickness, its internal surface is of a rose or red colour, which does not yield to washing, and which is, therefore, probably occasioned either by the vascularity of the part, (although in such cases, I have never been able to detect any distinct vessel)—or, more probably still, by the soaking of blood after death. In some rare instances we find tubercles entirely, or almost entirely, softened, in a portion of lung in other respects quite healthy and crepitous; and in such cases (four or five of which only I have met with in twenty-four years) the walls of the cavity are smooth, and seem to be formed merely by the pulmonary tissue somewhat condensed; there being no accidental membranous production whatever.

Encysted Tubercles.—Sometimes, but very rarely, the semi-cartilaginous membrane is perceptible before the softening of the tubercles, and, indeed, seems to be of the same date as themselves. This is the *encysted tubercle* of Bayle. (Op. Cit. p. [illegible] The texture of these cysts is entirely cartilaginous, only a little less solid than cartilage, and they belong, therefore, to the class of *imperfect cartilages*, of which I have given an account in another place.* They adhere firmly by their exterior surface to the parts which surround them, so as only to be separated by the knife, or by forcible detraction. The tuberculous matter contained in these, before it is completely softened, adheres strongly to their sides, and, when it is removed, these are seen to be smooth and polished, though more or less uneven or [illegible] ged. These encysted tubercles are more frequent in the bronchial glands than in the substance of the lungs.[*]

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* Dict. des Scienc. Med. *Art.* Cartillages Accidentels.

I have myself never seen these cysts, whether primitive or secondary, become ossified; this morbid state must, therefore, be very rare; but I have in my possession a cyst of the size of a hen's egg, converted into a bony substance, which was found in the lungs of a subject who seemed to have died, as far as I could learn, of phthisis. In this case the imperfect ossification appears to have commenced in three different points; as the cyst is composed of three portions, united by thin plates of cartilage not yet affected with the osteo-petrous degeneration. Bayle seems also to have found some bony points in this kind of cyst. (Op. Cit. p. 22.)

When there exists a great number of tubercles, even very small ones, in the lungs, death will sometimes take place before any of them has reached such a degree of softness as to have their contents discharged into the bronchi, and consequently to leave any ulcerous excavation. But this case is extremely rare, and never occurs unless there exists along with the phthisis, some other affection equally severe, or at least capable of accelerating the fatal event. When, on the contrary, there is only a small number of tubercles, we sometimes find them all excavated after death. In the majority of cases, however, the developement of the tubercles is evidently successive, so that, on examination, we find them in the same lung, in the different stages formerly described, viz. 1. In the state of granulations, either grey or colourless, and semi-transparent; 2. grey, but large, and yellow and opaque in the centre; 3. yellow and opaque throughout, but still firm; 4. in the state of grey tuberculous infiltration, gelatinous, or yellow; 5. softened, especially in the centre; 6. in the state of excavations more or less completely empty.[†] These observations are important in a therapeutical point of view, as we shall see afterwards; and I would, therefore, beg to call the attention of the practitioner to the successive developement of tubercles in the different parts of the lungs. They begin to show themselves, in the first place, almost always in the top of the upper lobes, more particularly in the right;* and it is in these points, especially in that last mentioned, that we most commonly meet with the tuberculous excavations of vast size.† It is by no means uncommon to meet with cavities of this kind, in the situation just named, when the rest of the lungs are quite sound, and do not contain a single tubercle; but in this class of cases, the patient, during life, has frequently exhibited no sign of phthisis, or only very equivocal ones,‡ and has died of some other disease. It is much more common, however, to find one single excavation, and several crude tubercles, in a pretty advanced state, in the summit of the lungs; and the remainder of these organs, although still crepitous, and in other respects sound, crowded with innumerable tubercles, of the miliary kind, extremely small, semi-transparent, and hardly any of them with the yellow speck in the centre. It is evident that these miliary tubercles are productions of a much later date than those which had given rise to the excavations. As well from the result of my dissections, as from observation of the sick, I am well assured that this secondary crop of tubercles appears about the time when the first set begin to be softened. Very commonly we observe in the same lung evident marks of two or three successive eruptions of tubercles. Almost always, in these cases, we find that the most ancient of those which occupy the summit of the lung, have already reached the stage of excavation; that the second crop, situated around and rather below these, has already become yellow, or at least the greater part of them, but are still of no great size; that the third eruption composed of crude miliary tubercles, with some yellow points in their centre, is situated still lower; and, finally, that the basis and inferior edge of the lung exhibit the most recent formation of all, consisting of miliary tubercles quite transparent. Some of this last variety are also found here and there, in the intervals between the zones containing the other formations. The varieties of the tuberculous infiltration which I have denominated grey and gelatinous, are almost always of secondary formation; and in most cases take place only subsequently to a secondary eruption of miliary tubercles. Exceptions to the order of developement just described are by no means common. It is extremely rare for excavations to be first developed in the middle or base of the lungs; it is less unsual to find the left lung more affected than the right; it is excessively rare to find the first eruption so very numerous as to prove fatal. In cases of this kind the patient falls a victim to the attendant fever, without ever exhibiting very considerable or sometimes even perceptible emaciation; and on opening the body we find a great number of very large crude yellow tubercles, more or less softened, and without any admixture of the miliary variety. These secondary eruptions of tubercles are not confined to the lungs; at the same period of the softening of the first crop in the lungs, they make their appearance in many other organs. In fact it is a rare case, in pthisical subjects, to find these bodies only in the lungs; almost always they exist, at the same time, in the coats of the intestines, where they give rise to ulcers, which, in their turn, become the cause of the colliquative diarrhœa which so often accompanies phthisis. There is perhaps no organ safe from the attack of tubercles, and wherein we do not, occasionally, discover them in our examination of phthisical subjects. The following are the parts in which I have met with these degenerations, and I enumerate them in the order of their frequency: the bronchial, the mediastinal, the cervical, and the mesenteric glands;* the other glands throughout the body: the liver—in which they attain a large size, but come rarely to maturation; the prostrate—in which they are often found completely softened, and leave, after their evacuation by the urethra, cavities of different sizes;† the surface of the peritoneum and pleura, (or in the false membranes investing these,) in which situations they are found small and very numerous, usually in their first stage, and occasion death by dropsy before they can reach the period of softening; the epididymis, the vasa deferentia, the testicle, spleen, heart, uterus, the brain and cerebellum, the bodies of the cranial bones, the substance of the vertebræ, or the point of union between these and the ligaments, the ribs, and lastly, tumours of the kind usually denominated *schirrus* or *cancer*, in which the tuberculous matter is either intimately combined with, or separated in distinct patches from, the other kinds of morbid substance existing in these. Tubercles are found more rarely in the muscles of voluntary motion than in any other part. The most remarkable case of this sort I have met with, was that of a consumptive patient who had tubercles in almost every situation mentioned above, and who had, besides, the ureters so much dilated as to receive the thumb, and their internal coat converted into an adhesive layer of tuberculous matter. In this person the lower extremity of one of the sterno-mastoid muscles was converted into tuberculous matter, firm and consistent; but the muscular structure was still preserved in the parts most altered. In those least altered, and which passed by insensible gradation into the sound portion, the tuberculous matter was in its early stage, grey and semi-transparent. I had particularly attended to this man's case; he never complained of pain in the neck, but merely of some difficulty in moving it. At the same time the cervical lymphatic glands were full of tubercles, and much enlarged. Sometimes, but very rarely, the production of tubercles begins in the parts just mentioned, especially in the mucous membrane of the intestines and in the lymphatic glands, and their appearance in the lungs is the result of a secondary formation.*

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[*] These encysted tubercles have been seen only once by Louis; (Op. Cit. p. 10.;) they must, therefore, as Laennec says, be very rare.—*Transl.*

[†] The almost constant coincidence of grey granulations and yellow tubercles is confirmed by the researches of Louis, who out of 358 subjects, only met with two examples of tubercles existing without granulations, and five of granulations without yellow tubercles; "and even in these cases," he says, "there were some granulations more or less yellowish in the centre." (*Recherches*, p. 3.) The same observer never met with the *jelly-like* matter except in the lungs of phthisical persons, and he might have said the same of the grey matter in mass, even while admitting, as he does, with M. Chomel, that the last may, in some instances, be only a form of chronic pneumonia. In making this remark, I must observe, 1st. that I feel a difficulty in refusing to believe that two alterations so constantly reunited, have some *necessary* connexion; and 2nd, that if this co-existence of yellow tubercles with granulations or grey matter in mass, is met with in other organs, it is difficult to believe that the latter when seated in the lungs, is merely a form of chronic inflammation, while the granulations are either the result of a hypertrophy of the air-cells, (M. Andral's opinion,) or a morbid condition of the blood-vessels which ramify around the same cells (M. Lombard's opinion).—(*M. L.*)

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* The experience of M. Louis has led him to an opposite conclusion respecting the relative frequency of tubercles in the two lungs. The following facts stated by him tend strongly to confirm this opinion; the only question is, whether his cases (123) have been sufficiently numerous to justify our adoption of the results furnished by them, as applicable generally to the disease. Of thirty-eight instances in which he found one upper lobe wholly disorganized, twenty-eight were on the left side; of eight cases of *perforation*, seven were on the left side; and of the seven cases in which the tubercles were confined to one lung, five were on the left side. (Op. Cit. p. 7, 8, 9.) These facts are very strongly in favour of his opinion, and are confirmed by the observations of many preceding writers. Stark says, "the lungs of the left side are more commonly affected than those of the right;" and Dr. Carmichael Smyth, in his remarks on this passage, (Op. Cit. p. 393,) says, "that the left side of the chest is more frequently affected by disease than the right, is a fact for which it may be difficult to assign a reason, but, that the observation is strictly true, any one may be convinced, who will take the trouble (which I have done) of comparing, with that view, the numerous cases of pulmonary phthisis related by Bonetus, Morgagni, and others."—*Transl.*

† The large tuberculous excavations of the upper lobe are found nearer the posterior than the anterior parts of the lungs, according to the original statement of Stark, (Op. Cit. p. 369,) and the later authority of Louis (Op. Cit. p. 13).—*Transl.*

‡ This I suspect was Laennec's own case. See the Memoir of his Life prefixed to this work.—*Transl.*

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* M. Louis found the mesenteric glands more frequently affected than any others, viz. in one-fourth of the cases. He also found the kidneys as frequently affected as the spleen, viz. in one-sixth of the cases.—*Transl.*

† I have frequently found these in cases where no symptoms of them had existed during life.—*Author.*

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* The opinion of Laennec on the relative frequency of tubercles in other organs besides the lungs, is confirmed, with some little variation, by the researches of Louis and Lombard. The following is the order of frequency observed by Louis in the 123 cases of phthisis recorded in his work: the small instestines one-third; mesenteric glands one-fourth; large intestines one-ninth; cervical glands one-tenth: lumber glands one-fourteenth; prostate one-fifteenth; spleen one-sixteenth; ovaries one-twentieth; kidneys one-fortieth. He only found tubercles once in the brain, cerebellum, spinal marrow, and uterus; and does not notice their occurrence in the liver, testicles, bones, muscles, sub-serous cellular tissue, &c. Only once did he find tubercles in false membranes on the pleura, and only thrice in those of the peritoneum. In one case only out of 358 tuberculous subjects, did he meet with tubercles in various organs, while there was none in the lungs. (*Rev. Med.* Sept. 1825.)

Lombard, in 100 adult subjects, gives the following as the proportional frequency of the tuberculated organs: intestines, 26; mesenteric glands, 19; bronchial glands, 9; cervical glands, 7; spleen, 6; lumbar glands, sub-peritoneal cellular tissue, 4; axillary glands, anterior mediastinum, 3; sub-arachnoid cellular tissue, spinal marrow, false membranes of the pleura and peritoneum, intercostal muscles, ovaries, 2; gall-bladder, liver, posterior mediastinum, pleura, vertebræ, ribs, omentum, uterus, prostate, bladder, brain and cerebellum, medulla oblongata, kidneys, vesiculæ seminales, 1. It is, however, worthy of remark that the same number of infant subjects gave proportions considerably different, viz. bronchial glands, 87; lungs, 73; mesenteric glands, 31; spleen, 25; kidneys, 11; intestines, nervous centres, 9; cervical glands, 7; meninges, 6; pancreas, gastro-hepatic glands, sub-peritoneal cellular tissue, 5; *spleen* 4; (?) inguinal glands, 3; sub-pleural cellular tissue, 2; lumbar glands, bladder, omentum, gall-bladder, false membranes of the pleura, 1.—(*M. L.*)

M. Louis says, that with one single exception, he never found tubercles in any other organ without their existing in the lungs at the same time, insomuch that he seems to consider their presence in the lungs as essential to their developement in other parts. This view of the subject is strengthened, he thinks, by the fact, that

Organic changes which usually attend phthisis.—The greater number of phthisical subjects, before death, attain that extreme degree of emaciation from which the Greeks derived the name of the disease. This emaciation is strongly marked in the adipose cellular membrane and muscles, but not at all in the internal organs. The intestines may appear contracted, but this is chiefly owing to their containing but little air. The brain, nerve, genital organs, spleen, pancreas and other glands, present no marks of emaciation. The blood-vessels appear commonly small; but this, no doubt, is owing to their having been a long time accustomed to contain only a small quantity of fluid, in consequence of the copious evacuations and the low regimen to which the patients are usually subjected. The bones lose nothing in point of length, but I have frequently thought that their diameter was lessened in cases of protracted marasmus. They become certainly of less specific gravity; and this, no doubt, is true of all the other organs; although the effect is produced in a variable manner; since we find, that, of two patients arrived at the same degree of emaciation, the one, with broad shoulders and tall, shall sometimes be much lighter than another of a feebler constitution and smaller stature. The chest of consumptive patients is usually narrow and sometimes evidently contracted. This contraction had obtained the notice of Bayle, but he did not investigate its causes. It appears to me to depend on one or other of the two following causes:—1. on the pleurisies to which phthisical patients are extremely subject, both before and during the course of their disease, and which, as we shall see hereafter, always give rise to a contraction of the chest when they terminate favourably; or,—2. to the attempts made by nature to cure phthisis, which, as we shall find presently, likewise occasion a similar result. The serous membranes and the skin are commonly very pallid and bloodless in phthisical subjects. The muscles, on the contrary, particularly the heart, are usually of a bright red. The latter organ is moreover always remarkable on account of its smallness and firmness: may it be affected by the general emaciation? The intestines sometimes exhibit ulcers, which do not seem owing to the development and softening of tubercles situated in their membranes; but those arising from this latter cause are much more common. Ulcers of the kind last mentioned, are characterized by the developement of small miliary tubercles, or of tubercles of the size of hempseed at most, in the mucous or muscular tunic, and sometimes immediately beneath the peritoneum. They occur most frequently

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(with a single exception) he always found the tuberculous matter much more advanced in the lungs than in the other parts, and also that the tubercles in all the other parts were always in the same degree of developement. In the single case above alluded to, he found tuberculous matter in the mesenteric glands when none existed in the lungs. (Op. Cit. p. 179.)—*Transl.*

in the small intestine, and chiefly near its termination. They gradually corrode the intestinal tunics, in proceeding from within outwards, and are very frequently found resting on the peritoneum only. Perforation of this tunic, is, nevertheless, uncommon.[*] When it takes place, the effusion of the intestinal matters into the peritoneum usually produces an acute inflammation of this membrane accompanied by tympanites. However, when the perforation is small, it is frequently obliterated by the adhesion of the edges of the perforation to the contiguous portion of peritoneum covering the intestines or other viscus, by means of the lymph effused in the first moments of the inflammation. In this case, the peritonitis may become chronic; and almost always, when this happens, a very plentiful eruption of secondary tubercles is formed in the false membranes produced by the inflammation. This adhesion of the perforated intestine presents sometimes a remarkable variety. At the very moment when the perforation takes place, the intestine becomes agglutinated to the contiguous peritoneum, by means of a moderate effusion of coagulable lymph, like thickish paste, in such manner that neither effusion of the intestinal contents, nor peritonitis, properly so called, takes place. It is no doubt true that the exudation just mentioned must be considered as a product of inflammation, however slight; but in such cases, the patient during life complains of no pain, and after death the peritoneum is not found red. This species of sub-inflammation and the secretion resulting from it, seem to be very analogous to the adhesive inflammation of wounds which unite by the first intention. I have several times observed similar adhesions in the case of perforation of the stomach and intestines, arising from other causes, particularly cancers, gangrenous eschars, or the colourless softening lately described by Jaeger[†] and Cruveilhier.[‡]

The mucous membranes are generally pale, even in the vicinity of the ulcers, except in the cases where an acute fever and prolonged struggle have preceded death, and given rise to sanguineous congestions in different parts.[*] It is a common opinion, strengthened by the adoption of it by Bordeu, that phthisical subjects are particularly liable to fistula in ano, which help to protract the termination of the disease. I have seldom observed this complication; and where it existed it has appeared to exert no influence over the progress of the case.[†] The liver is frequently large, of a very pale yellow colour, and strongly impregnated with a fatty matter, not always of the same nature.[‡] Sometimes this is very similar to fat: but at other times, from its appearance and consistence, it would seem analogous to those fatty bodies, long confounded under the general name of *adipocire*, and which M. Chevreul has proved to be of different kinds.[§] This fatty infiltration of the liver is met with in other chronic diseases as well as phthisis, and I have even seen it in cases where no organic affection of any severity co-existed.[||] Broussais seems to think that this condition of the liver is sympathetic of the inflammation of the duodenum. I would here remark that I have seen but few well-marked instances of inflammation of this intestine; and I suspect that it will be admitted to be extremely rare, by all anatomists who do not confound the congestions of the dead body with inflammation. Certain it is, that I have frequently found the duodenum very red when the liver was sound, and the fatty disorganization of the latter present, when the duodenum was very pale.[¶] The animal fluids seem to have very little tendency to septical decomposition in phthisis; since we find that patients in this disease, are much less liable to gangrenous eschars on the back, from long confinement than in many others, and that their bodies after death are slow in running into putrefaction.

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[*] "There existed (says M. Louis) ulcers in the small intestines, of a greater or less extent, and more or less numerous, in five-sixths of the cases. They were almost as frequent in the large intestines; the mucous membrane of which, moreover, although often red and thickened, was as soft as mucus, over its whole extent, or a great part of it, in one-half the cases. Indeed, I found this intestine sound over its whole extent in three cases only." (Op. Cit. p. 175.) Bayle found the intestines ulcerated in sixty-seven cases in the hundred. Andral says, that among all the phthisical cases which came into M. Lerminier's wards for five years, he found the intestines completely sound in one-fifth only. (Clin. Med. t. iii. p. 306.) For an account of the symptoms resulting from *perforation* of the intestines in acute diseases, see M. Louis's memoir on this subject in his "*Memoires ou Recherches Anatomico-pathologiques.*" Paris, 1826, p. 136. He says that he only found the small intestine perforated once in one hundred and fifty cases of phthisis.—*Transl.*

[†] Hufeland's Journ. May, 1811.

[‡] *Medicine eclairée pur l'Anat. pathol.* Paris, 1821.

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[*] This statement is not correct. The gastro-intestinal mucous membrane is often red in phthisical subjects. Andral met with it completely pale in a fifth part, at most, of his phthisical subjects. (*Clin. Med.* t. iii. p. 306.) Louis found the mucous membrane of the stomach red, softened, thickened in one-twelfth of his cases; that of the small intestines reddened totally or partially in one in seven, and that of the large intestines in one of four. (*Recherches*, pp. 81, 96, 174.) In like manner the mucous membrane of the trachea is very often both red and ulcerated; whilst it is extremely rare to find that of the bronchi perfectly pale; in this last case, the redness is generally more marked in the vicinity of the excavations, no doubt in consequence of the irritation produced by the continual passage of the softened tuberculous matter.—(*M. L.*)

[†] Andral says he only met with one instance of fistula in ano in about eight hundred cases of phthisis.—*Transl.*

[‡] M. Louis found the fatty degeneration of the liver in one-third of his cases; and exactly the same proportion is recorded by M. Andral, as the result of his experience. —*Transl.*

[§] *Recherches sur les Corps gras, &c.* Paris, 1823.

[||] Such cases are, however, rare. Louis noticed the fatty liver in one-third of his phthisical subjects, while he only met with it twice in 220 cases of other diseases. M. Louis further observed this morbid state of the liver in phthisical subjects more frequently in women than men (in the proportion of four to one); and likewise that in the great majority of such cases the duodenum was sound. (Op. Cit. p. 115 et seq.)—(*M. L.*)

[¶] For a most accurate and minute account of the various lesions usually accompanying phthisis pulmonalis, I refer the reader to the three classical and truly admirable works of Bayle, Andral, and Louis. From the last of these, more particularly, I shall here extract a brief notice of the principal of these complications, not already fully noticed in the text. Inflammation of some portion of the *lungs* or *pleura* was found in one-tenth of the cases; but we have seen in a former note that this proportion is not greater than in the subjects dead of other chronic diseases.

I shall conclude what relates to the morbid anatomy of phthisis, by the examination of two important questions, which can only be resolved by means of the data supplied by anatomy. These questions are the following:—1. Are tubercles the effect of inflammation? 2. Is tuberculous phthisis susceptible of cure?

The mucous membrane of the *trachea* was simply red, or somewhat thickened and softened in one-fifth; and ulcerated in a somewhat less proportion than one-fifth. The *larynx* and *epiglottis* were ulcerated in one-fifth. (Bayle found the proportion one-sixth; and Andral found the larynx affected in one form or other in as many as three-fourths.) The *pericardium* contained a "notable" quantity of serum in one-tenth. (Andral found the *heart* diseased or altered in as great a proportion as two-thirds.) The stomach was much distended and lower than natural in one-twelfth; its mucous membrane was softened and thinned,—or very red, very soft, and thickened, in one-fifth; ulcerated in many cases; and quite sound only in one-fifth. (Andral says in two-fifths.) The *peritoneum* contained an effusion of serum, from one to six pints, in one-fourth; and the lateral ventricles were distended by a "notable" quantity of the same, in three-fourths. The *brain* was more or less injected in one-seventh; its consistence over its whole mass was diminished in one-twentieth, and it was partially softened and pulpy in the same proportion. Of the lesions the following supervened only during the days of life, viz. pneumony, pleurisy, softening and redness of the large curvature of the stomach, pulpy softening of the mucous membrane of the colon, peritonis, arachnitis, partial softening of the brain. Others existed long, some even from the beginning of the disease, among which he mentions the softening with extenuation of the mucous membrane of the stomach, and (sometimes) the large intestinal ulcers. Some of the affections previously enumerated, are considered by M. Louis as peculiar to phthisis; others as independent of it, and existing in many other chronic diseases. Of the first kind, he mentions the following: Ulcers of the larynx, and more particularly of the trachea and epiglottis; ulcerations of the intestines, especially of the smaller; and the fatty degeneration of the liver. I need hardly add to this detail of the various and numerous severe affections that complicate phthisis, an admonition to the young practitioner not to overlook them in the treatment of his patients. I shall probably return to the subject hereafter; but I cannot resist making one observation relative to the complication of gastritis, (both acute and chronic,) so very common in phthisis, and, I believe so frequently lost sight of in the practice of many practitioners. Andral says—"The frequency of gastritis in consumption being well proved, it follows as a necessary consequence, that it is only with the greatest care and attention that we can venture to apply substances of an irritating nature to the mucous membrane of the stomach. Many of the inflammatory affections of this organ in phthisical subjects are aggravated and rendered permanent, by being overlooked and left to themselves, merely because they give rise to no very prominent symptoms." (Clin. Med. tom. [illegible] p. 306.) In reference to this complication, I would here merely allude to two opposite yet very common plans of *diet*, recommended in this disease,—one [illegible] entirely of animal food, with porter, wine, &c. and the other of milk and vegetable and farinaceous matters. In such a complication, the one must be proper, and if it do not tend to cure the disease, cannot at least accelerate its progress; the other must be injurious in the highest degree, both in its present operation and future consequences —*Transl.*

SECT. II. *Examination of the question, whether or not tubercles are the consequence of inflammation.*

The ancients attributed to inflammation, the developement of all the accidental productions with which they were acquainted, and which they generally confounded under the names of schirrhus, tumour, tubercle (σχιρροι, φυματα); and although this opinion had, during the last century, been rendered doubtful by the progress of pathological anatomy, yet Bayle was the first who exploded it by positive facts.* Broussais, who about the same period pursued his investigations in the miliary hospitals, and who no doubt was ignorant of what was passing at Paris, maintained the ancient opinion, and endeavoured to support it by facts observed by him. More recently this author has impugned the correctness of Bayle's opinion;† and he still constinues to do so, more by assertion and ratiocination, however, than by facts. This question appears to me so important, that I shall consider it in reference to each individual texture of the lungs; and inquire accordingly, to which of the inflammatory diseases of the chest—pneumonia (acute and chronic), catarrh, pleurisy,—the development of tubercles is owing.

Acute pneumonia.—If we question any practitioner ignorant of morbid anatomy, but who is a man of observation and free from prejudices, I have no doubt that he will give it as his opinion that it is very rare to see the symptoms of phthisis supervene to acute pneumonia. Even in the cases where this sequence is observed, it is impossible to say whether the pneumonia has given rise to the tubercles, or whether these, acting as irritating bodies, have not excited the pneumonia. On the authority of pathological anatomy, the solution of the question is much more simple; since it is certain that we very rarely find tubercles in the lungs of those who have died of pneumonia, and that the greater number of consumptive subjects exhibit no symptom of this disease during the progress of their fatal malady, nor any trace of it after death. Many of these even, have never been affected with it during the whole course of their life. If tubercles were merely a product or termination of acute pneumonia, we should be able to ascertain the different steps of the transition of the one into the other, in the same manner as we are able to describe all the intermediate degrees between the simple inflammatory engorgement and the pulmonary abscess. But this is far from being the case. It is said that chemical analysis discovers no difference between the softened matter of tubercles and true pus; in like manner I say that it discovers none between the albumen of the egg and the secretion of certain cancers; but these facts prove the imperfection of chemistry, rather than the identity of the matters in question. In almost all their physical characters, tubercles differ from pus; and in one other remarkable particular there is a striking diversity between them: after the complete evacuation of the matter of a softened tubercle, it is never renewed; while the walls of an abscess are well known to continue to secrete pus, after it has been opened. The following is the only case which could be mistaken, even by an inaccurate and prejudiced observer, for the termination of pneumonia in tuberculous matter:—Three or four times I have found small irregular masses of yellow tuberculous matter in the midst of a portion of hepatized lung. In one of these cases, two tuberculous masses of the size of filberts, existed in the centre of a portion of lung already advanced to the stage of purulent infiltration. Even in this case, however, the tubercles were very readily distinguished by their colour, which was much paler than that of the surrounding parts; and indeed it formed a marked contrast with the deeper yellow, verging on ash-grey of the purulent infiltration. These parts differed in another respect also; on scraping the surface of the tuberculous mass, no fluid could be squeezed out, while on pressing the other, a bloody pus was collected on the scalpel. It would certainly be absurd to infer from this very rare case, that the tuberculous masses were the effect and termination of the pulmonary inflammation; for independently of the rarity of the case in question, compared with the frequency of hepatization, on the one hand, and of tubercles on the other, I have found tubercles of exactly the same kind in lungs which were, in other respects, quite sound. It is certainly more probable that, in this case, the tubercles existed previously to the pneumonia, or even that they gave rise to it, as foreign bodies producing irritation. On referring to facts, it is found that acute pneumonia and tubercles occasionally co-exist; but this co-existence is rare when we take into account the great frequency of both diseases. In nineteen-twentieths of the cases of this complication, the tuberculous affection evidently preceded, and we may, therefore, infer either that the tubercles are the occasional cause of the pneumonia, or that the diseases, although co-existing, have no etiological relation to each other. I am willing to admit, as a matter of no evil consequence in practice and of no importance in theory, (although it is supported neither by direct experiment nor positive observation,) that, in the small number of cases where pththisis is seen to arise during the convalescence from acute pneumonia, the inflammation may sometimes accelerate the developement of the tubercles, to which the patient was previously disposed, from some other cause,—of the nature of which we are ignorant, but which is assuredly different from inflammation. In this case, although the inflammation cannot, by itself, produce tubercles, it may, through the excess of action and nutrition wherewith it is attended, hasten their appearance; in the same way (to use a comparison, which is perhaps not so foreign to the process as it may seem at first sight) as a soil well tilled after a long fallow, or left fallow after several years' culture, will cause many seeds to germinate which had lain within it, in a state of inactivity, for several years.[*]

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* Recherches sur la Phthisie pulmonaire, p. 136, *et passim.*

† Exam. des Doct. Med. Paris, 1816.

Chronic pneumonia.—It was stated in a former chapter how rare true chronic pneumonia is; and we have seen how different the appearance and physical characters of this affection are from those of tubercles. It is evident that in chronic pneumonia the inflammatory engorgement is confined to the air-cells, which are seen closely pressed together, like the eggs of certain insects, without any intervening space, all of the same size, and of a reddish, greenish, or yellowish colour. When of the last-mentioned colour, if they are pricked with a needle, they sometimes exude a drop of pus. If we compare this lesion with miliary tubercles of the smallest size, which from their roundish shape might seem also to be formed in the interior of an air-cell, we shall find an immense difference between them. These latter bodies, as we have already stated, are either diaphanous or quite transparent, and, however numerous they may be, are always disseminated, at least in their earliest stage, through the sound and crepitating lung: they grow by intus-susception, and do not coalesce until they have lost their primitive shape and colour. If we submit the other varieties of the tuberculous degeneration to the same kind of comparison, we shall find, in like manner, that there exists no relation whatever between them and chronic pneumonia. M. Broussais, nevertheless, who seems never to have met with the true chronic pneumonia, wishes to consider phthisis as such. After what has been stated, it would be useless to discuss the question anatomically. The single fact of the existence of a chronic pneumonia, very different from the tuberculous affection, both in its anatomical characters and its symptoms, is sufficient, in my opinion, to decide the question in the negative.[†]

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[*] Laennec thus admits that acute pneumonia may sometimes expedite the development of pulmonary tubercles, that is, be the *occasional cause* of them in a *predisposed* subject; but he contends, with much apparent reason, that it cannot be the *proximate* cause: and those who regard tubercles as a morbid secretion always preceded by an inflammatory or congestive process, have not been able to go further than this. (*See* Andral, Clin. Méd. t. iii. p. 56. Lombard, Op. Cit. p. 30, &c.)—(*M. L.*)

[†] The distinction which Laennec here labours to establish between true chronic pneumonia and the grey or jellylike tuberculous infiltration, is completely rejected by the new anatomical school of which Andral and Cruveilhier may be regarded as the heads. According to M. Andral, we have in the grey infiltration nothing but *the highest degree of induration of the air cells and minute bronchi*, (Précis d'An. Path. t. ii. p. 547,) and in the jellylike infiltration a secretion *sui generis*, just as we find other peculiar kinds in the system (*Dict. de Méd.* Art. *Phthisie*, t. xvi.) I will not attempt to refute these propositions, although they appear to me far from being proved. I will merely make the same remark in reference to the grey infiltration, which I made respecting the granulations: *it is met with in many other organs beside the lungs.*—(*M. L.*)

Catarrh.—There is not a more ancient opinion in physic, or one that has been longer adopted by the vulgar, than that an ill-treated or neglected cold is apt to degenerate into phthisis. This old notion has been adopted by M. Broussais, with no better reason, apparently, than that which influenced its early patrons—*post hoc, ergo propter hoc.* We shall now proceed to examine the foundation on which it is considered to rest.—It is no doubt true, that in most phthisical cases, the first symptoms are those of pulmonary catarrh; but it is equally true, that we find very large and very numerous tubercles in subjects who exhibit no signs of catarrh. If it be said that the tubercles are the product of former catarrhs, I reply, that they exist in persons who have not had catarrh for years, or even, as far as they can recollect, at all. We indeed frequently observe a pulmonary catarrh (coming on suddenly during a state apparently of perfect health, or after slight indisposition which do not seem at all to affect the chest) to be the first obvious symptom of a tuberculous phthisis: this, however, is found to have existed long in a latent state; since we find, on examining the chest of such subjects, all the physical signs of tubercles, and sometimes even of tubercles already excavated. The same thing is also very common in those irregular cases of phthisis, of which the first and chief symptom is an invincible diarrhœa. On the other hand, thousands of persons have catarrh several times every year, and yet very few of these become phthisical. We even very frequently meet with individuals who take cold incessantly from the slightest changes of weather, and in whom each cold is merely an aggravation and manifestation of an habitual latent catarrh under which they labour, as I stated on a former occasion. There is another numerous class of persons, who, during a long series of years, are affected with a pituitous or mucous catarrh, with copious expectoration, and who nevertheless, frequently reach an advanced age without becoming phthisical. The inhabitants of our coasts are much more subject to catarrh than those in the interior; few of the former being without some sign of this disease, latent or manifest; and yet consumption is much rarer in the former situation than in the latter.* I am far from wishing to infer from this fact, that pulmonary catarrh is a preservative against the developement of tubercles, but I think I may conclude that it is not the cause of these. I am moreover of opinion, that every practitioner who shall investigate this matter attentively, impartially, and thoroughly, will admit, that if we sometimes observe phthisis occurring in subjects very liable to colds, we find a much greater number of these not becoming phthisical; and that, on the other hand, we meet with many persons whose *first cold*, is merely the catarrh that accompanies phthisis, excited, no doubt, by the presence of tubercles in the lungs. For my own part, the result of my whole medical experience leads me to look with suspicion and apprehension on the *first cold*, if it shows itself after the twentieth and before the sixtieth year.

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* We cannot assent implicitly to this statement. Sufficient materials whereon to build a solid judgment do not yet exist; nor can they do so, until the neglected, but most important subjects of medical topography and medical statistics are much more cultivated than they are at present. As far as regards the prevalence of different diseases in different places, we possess, in this country, the most correct and most means of judging, in our numerous dispensaries and hospitals. All that is wanting is co-operation among the members of the profession; and I have long thought that this might be obtained without much difficulty. In respect of the relative prevalence of consumption in different places of this island, we have some valuable documents in the works of Haygarth, Woolcombe, Southey, Bateman, &c. &c.; but none of sufficient accuracy to enable us to confirm or confute the assertion in the text: my own experience, however, leads me strongly to doubt its truth.—*Transl.*

I would here return to the consideration of the question in an anatomical point of view, and shall repeat the argument formerly used in regard to pneumonia. To prove that phthisis is an effect and termination of catarrh, it would be necessary to exhibit anatomically the marks of the transition of the one into the other. But this, I conceive, is not only impracticable, but the idea almost absurd, inasmuch as we know that catarrh consists in an inflammation of the mucous membrane of the bronchia, whilst tubercles are accidental productions, that is, real foreign bodies, which spring up in the substance of the lungs, and may be developed in any other texture of the body; whilst nothing is more uncommon than to meet with these bodies in the bronchial membrane itself, even when the lungs are completely charged with them.* Substituting hypothesis for fact, we may, indeed, suppose, from their roundish form, that miliary tubercles originate within the bronchial cells, and are, in fact, the consequence of the inflammation of these.† We may *suppose*, in like manner, from some similarity in the colour and other physical characters between incipient tubercles and the pearly sputa, that the former are composed of the same materials as the latter, only more condensed. By such hypotheses as these, we may demonstrate whatever we please to those who will receive our notions without proof; but minds of a more philosophic temper will hesitate before they pass the boundaries of observation; and, where the question is one of facts, will admit of no solution that is founded merely on suppositions. In the present case, anatomy affords us no assistance. From the exact round or ovoid shape of certain miliary tubercles, I have certainly been sometimes disposed to imagine that they might be formed in the air-cells; but I have never been able to convince myself of the fact. Besides, if such were the case, it could scarcely happen that some of these granulations should not sometimes be dislodged and expectorated. But this has never been observed. On the other hand, this supposition is rendered extremely improbable by the very irregular form of most of the grey miliary tubercles, and by their intimate adherence to the pulmonary substance; and the hypothesis becomes altogether idle and frivolous, when we recollect that it is still a matter of doubt whether the pulmonary tissue is in fact composed of cells or of a simple intertexture of vessels.* It has been asserted by one of M. Broussais's disciples, that he could produce tubercles at pleasure, by *irritating in a certain manner* the bronchi of a dog; but I believe that the thing has never yet been done, nor the manner of doing it ever explained. It can only be when the process is exhibited to us, that we can ascertain whether a secretion of pus may not have been mistaken for tubercle.†

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* I do not think the argument used in this and the preceding sentence is sound. There can be little doubt, I presume, that enlargement and disease of the mesenteric glands are often the consequence of irritation or inflammation of the mucous membrane of the intestines, when we can trace no appearance of *tubercles* in this.—*Transl.*

† This would appear to be the opinion of Andral, or, at least, one of his opinions—for he seems to have several. See Clin. Med. t. iii, p. 11.—*Transl.*

Pleurisy.—Without entering upon the hypothesis used by M. Broussais in his attempts to explain the supposed production of phthisis by pleurisy, I shall confine myself, in this place, to the examination of the data furnished by pathological anatomy towards the solution of the question. In a case of severe pleurisy, the *inflammatory afflux* is not propagated to the lung: on the contrary, the copious secretion of serum which takes place at the very beginning of the disease compresses this organ against the mediastinum, and thereby diminishes its stock of blood and other juices. It ought to result from this, that if (as M. Broussais maintains) tubercles are produced by inflammation and irritation, pleurisy should seem more likely to prevent than facilitate their formation in the pulmonary substance, since it extinguishes nearly all their vital energy. In cases of empyema of more than a year's standing, we constantly find the substance of the lung sound, with the exception of its being compressed. And in most of the cases in which I have met with the tubercles co-existing with empyema, this disease has been the consequence either of perforation of the pleura by a softened tubercle, or of the presence of a great many tubercles immediately beneath this membrane. It is a thing of every day's occurrence, to find pleurisies, either latent or manifest, supervene in the progress of phthisis; and in those rare cases where this disease seems ushered in by an attendant pleurisy, the stethoscope enables us to detect in many of them, the presence of a great accumulation of tubercles in the upper part of the lungs, or even of some already softened and excavated. We may, therefore, I conceive, rigorously conclude, that pleurisy is very frequently an *effect* of the presence of tubercles in the lungs; and that, if we admit that it is sometimes a *cause* of them, we can neither demonstrate this, nor yet be certainly convinced of it.*

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* All that Laennec regarded as possible, or supposable, is admitted as positive by those who regard tubercles as a species of pus. M. Magendie was the first who imagined that the secretion of this pus took place in the pulmonary cells, and he conceived that if the secreted matter did not exactly fill the cellules, it might be at once expectorated. (*Journ. de Physiol.* t. i. p. 82.) M. Cruveilhier went further, and imagined that this mode of formation and this site of tubercles, might explain at once their rounded form and their simultaneous developement in many parts of the lungs. (*Méd. Pract. éclairée.* p. 175.) More lately Andral, considering that tubercles are not found exclusively in the lungs, believes that the secretion of pulmonary tubercles may take place indifferently either on the free surface of the bronchi or in the cellular tissue which unites together the various parts of the lungs. (*Clin. Méd.* t. iii. p. 28.) And, finally, M. Lombard regards this cellular tissue as the exclusive site of the tubercular secretion, and chiefly on this consideration—that being at its formation a fluid, the tubercular matter must be immediately expectorated and would show itself in the sputa, if deposited in the bronchi. (*Essai sur les Tuberc.* p. 22.)—(*M. L.*)

† The experiments alluded to in the text are now well known being the injection of mercury into the air passages, whereby tubercles were imagined to be developed in the lungs. But, as Laennec supposed, in this experiment, pus was mistaken for tuberculous matter, and by no less eminent a person than Professor Cruveilhier. "I injected," says he, "through an opening made in the trachea of a dog, two ounces of mercury, the greater portion of which was rejected by coughing. The dog, however, became apparently phthisical, and died emaciated at the end of a month. The lungs were crammed with tubercles both isolated and agglomerated, having all the character of miliary tubercles." (*Nouv. Bib. Méd.* Sept. 1826, p. 391.) M. Andral made the same experiment conjointly with M. Lombard, but he reports differently of the results. "The mercury contained in the smaller bronchi was enveloped in a thick layer of puriform mucus, which was in some points quite liquid, and in others very like the false membrane of croup, when only become half-solid. In several places the bronchial parietes were torn, and the mercury extravasated in the pulmonary tissue was surrounded by purulent matter: *we observed nothing besides* (*Précis d'Anat. Path*, t. ii. p. 551.) I may here observe, that M. Andral, who maintained the primary liquidity of tubercles in 1826 (*Clin. Méd.* t. iii. p. 4, et seq.) denies this in 1830, and seems disposed to think that, like the epidermis, tubercles may be secreted in a solid form. (*Précis d'Anat. Path.* t. i. p. 413.)—(*M. L.*)

From all that has gone before, we are authorised to conclude, that tubercles are not the product of inflammation of any one of the constituent textures of the lungs. On the contrary, a multitude of facts prove that the development of the tubercles is the result of a general condition of the body; that it takes place without previous inflammation; and that, when inflammation coincides with tuberculous affection, it is most frequently posterior to it in its origin. To convince ourselves of the accuracy of this last proposition, we need only examine the progress of tubercles in scrophulous glands. We very frequently find these to swell, and remain for a long time in this state, and without any redness either of the adjoining skin or even of the substance of the gland itself. It is frequently even several years before any marks of inflammation show themselves; but when this occurs, it seems to accelerate the softening of the tuberculous matter. Sometimes, however, not only the softening of this matter, but even the perforation of the skin, and the discharge of the pus take place without any distinct mark of inflammation. When this occurs, it has its site evidently in the parts contiguous to the gland, and not in the gland itself. Another proof of the same fact, and one equally strong, is supplied by the existence of those secondary eruptions of tubercles, particularly such as affect many organs at once, and which originate without any obvious sign of inflammation. In instances of this kind, it is impossible not to see a constitutional or general affection.—What has just been said of inflammation, applies equally, as Bayle has well observed, to other general and local causes to which some have attributed phthisis; such as syphilis, croup, scurvy, eruptions, &c. These may hasten the development of tubercles already existing; they may even sometimes, perhaps, determine their development in subjects predisposed to them: but in such cases, they are merely occasional causes; the real cause, like that of all diseases, being probably beyond our reach.*

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* For some strong arguments and facts against the doctrine of tubercles being a consequence of pleurisy, pneumonia, and catarrh, I refer the reader to M. Louis's Treatise, p. 503, et seq. He says, that of eighty phthisical subjects, into whose previous history he had particularly inquired, only seven had ever been affected with pneumonia, and four of these had been perfectly free from any pectoral affection for several years before the invasion of the phthisis. He notices the fact formerly stated by our author, of tubercles being most frequent in the upper lobes, while pneumonia most commonly occupies the lower. He adds, that pneumonia rarely affects both lungs, while phthisis almost always does so; and that the former is most common in men, while the latter is so in women. The same remarks, he says, apply to pleurisy and catarrh, with this addition, that in cases of chronic pleurisy, he has found as many tubercles in the lung of the sound as in that of the diseased side. Out of the eighty cases of phthisis above alluded to, only twenty-three had been particularly subject to catarrh; and out of one hundred and forty-nine cases of catarrh treated by him, only fifty-two occurred in women.—*Transl.*

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* Very various opinions respecting the origin and nature of tubercles have been entertained by medical writers; for a brief outline of which I refer the reader to the very learned work of Dr. Young on consumptive diseases. It is hardly necessary to refer to the crude notions of the ancients on this subject. Hippocrates considered them as owing to the putrefaction of the phlegm or bile; and the opinions of his successors, and those of Galen, for many centuries, were equally intelligible and correct. In more modern times still greater variety of opinion has prevailed respecting tubercles. They have been considered as lymphatic glands, rendered visible by inflammation, in the first place, and then subjected to the common progress of this morbid process, such as suppuration, ulceration, &c. This was the opinion, with some slight difference, of Sylvius, Wepfer, Tralles, and a great many of our more modern writers; and it is still that of M. Broussais. By many others they have been considered as the direct product of inflammation of the pulmonary substance, as stated in the text. Dr. Reid, with many early writers, considers them as originating in an obstructed state of the exhalent vessels of the lungs, caused by the viscidity of their contents. Dr. Rush says they are a collection of inorganic mucus, &c. The opinion maintained by our author, and which is that of Bayle, and indeed of almost every pathologist of eminence since his time, is now almost universally adopted by medical men. A remarkable deviation from this general assent, however, (as was noticed in a preceding note,) has been maintained with singular zeal by one distinguished English physician, Dr. Baron, of Gloucester, who attempts to prove that tubercles are essentially *hydatids*, and that the progress of the tuberculous disease is precisely the reverse of that described by Laennec.—*Transl.*

The discussion in the text respecting the inflammatory or non-inflammatory origin of tubercles in the lungs, is now become idle, since all good observers are of accord on this point—that they are in all cases the consequence of a predisposition either congenital or acquired. It is of little consequence whether tubercles are or are not the consequence of inflammation, if it be shown that this consequence can only ensue under given circumstances. The only thing of importance is to know

SECT. III.—*Examination of the question, whether or not Phthisis is curable.*

To many practical physicians, who are not anatomists, the possibility of a cure taking place after the formation of an ulcerous excavation in the lungs may seem quite admissible. This opinion, however, will, in all likelihood, appear quite absurd to those who have paid much attention to morbid dissection. Previously to the knowledge of the true character and mode of development of tubercles, and while consumption was considered simply as a consequence of the chronic inflammation and slow suppuration of the pulmonary tissue, medical men did not question (any more than the vulgar now do) the possibility of curing this disease by a suitable mode of treatment, especially if *taken in time*, and during the *first stage* of it. M. Broussais still flatters himself with the same hope. (Exam. des Doct. Méd.) It is now, however, the general opinion of all those who are acquainted with the actual state of our knowledge respecting the pathology of diseases, that the tubercular affection, like cancer, is absolutely incurable, inasmuch as nature's efforts towards effecting a cure are injurious, and those of art are useless. Bayle, in particular, advocates the incurability of this disease; he, however, admits the possibility of its being almost indefinitely prolonged. The recent researches made in England and Germany have led the best informed physicians of those countries to the same result. The observations contained in the treatise of M. Bayle, as well as the remarks made in the present chapter, on the development of tubercles, sufficiently prove the idea of the cure of consumption in its early stage to be perfectly illusive. Crude tubercles tend essentially to increase in size and to become soft. Nature and art may retard or even arrest their progress, but neither can reverse it. But while I admit the incurability of consumption in the early stages, I am convinced, from a great number of facts, that, in some cases, the disease is curable in the latter stages, that is, *after* the softening of the tubercles and the formation of an ulcerous excavation.

these circumstances, that is, to ascertain the predisposing causes of phthisis, as it is on this knowledge alone that any rational treatment of this dreadful disease can be founded.

I may here remark, that with the exception of what is given by our author in the ensuing section, on the cicatrization of tuberculous cavities, the anatomical history of tubercles has been enriched by no new fact since the labours of Bayle; what M. Andral has advanced respecting granulations and tuberculous infiltration cannot be considered as such. M. Rochoux alone, in my opinion, has any claim to be regarded as having added any thing to what was previously known on the subject, if it is indeed true, as he states, and as my own observations lead me to believe, that tubercles first present themselves under the form of a reddish point, previously to becoming grey and semi-transparent bodies.—(*M. L.*)

Occasionally, while examining the lungs of subjects that had suffered from chronic catarrh, I have observed irregular cavities lined by a semi-cartilaginous membrane in all respects similar to that described above; and these cavities accorded perfectly with the tuberculous ulcerations, except that they were empty. In carefully investigating the history of such subjects, I found that they all referred the origin of their catarrh to a severe previous disease, which bore the character of consumption so strongly as to make their case, at the time, be considered desperate. On the other hand, in subjects dead of consumption, whose disease had lasted very long, several years for instance, we very commonly find similar excavations entirely lined by semi-cartilaginous membrane, and free, or almost free, from tuberculous matter. In the same lung we shall also find excavations having the cartilaginous membrane much softer and less complete, and still containing a considerable quantity of tuberculous matter; while other excavations are observed almost filled with the puriform tuberculous fluid, and with scarcely any of the cartilaginous lining. In conjunction with all these, we almost always find tubercles in various degrees of maturation, and even in their miliary and semi-transparent stage. This re-union of tubercles in all their various degrees of development, considered in conjunction with the slow progress of the disease, decidedly proves, in my opinion, that the tubercles have been developed at different periods; and that the oldest—those namely, which have given rise to the empty ulcerous cavities lined by the cartilaginous membrane—have originated, in many cases, several years before the others. The formation of this semi-cartilaginous membrane on the surface of tuberculous excavations, must be considered, in my opinion, as a curative effort of nature. When completely formed, it constitutes a sort of internal cicatrix analogous to a fistula, and is, in many cases, not more injurious to health than this species of morbid affection. All the persons whose cases I noticed above, died of diseases not referable to the pulmonary organs. They had all lived a greater or less number of years in a very supportable state of health, being merely subject to a chronic catarrh. Some indeed had more or less of dyspnœa, but without any fever or emaciation.

I have within these few years had under my care several patients affected with chronic catarrh, and who afforded distinctly the sign of pectoriloquy, although they had in no other respect any symptom of consumption. I have met with several other cases, wherein this phenomenon was observable along with a slight habitual cough, very little expectoration, and scarcely any marked alteration in the general health. In a lady, formerly a patient of M. Bayle, fourteen years since, and whose case was decidedly consumption, (as appears from M. Bayle's notes in her possession,) the sign of pectoriloquy is most distinct. This lady recovered beyond all expectation; she is now stout, and the only symptom she has at all referable to the lungs, is a slight cough. I have no doubt that the cartilaginous excavations above described exist in this person's lungs.

Indeed, I feel assured that when the use of the stethoscope becomes more general, it will be found that in those cases in which a well-marked phthisis attended by pectoriloquy, is converted into a chronic catarrh, the pectoriloquy will frequently continue through life, and anfractuous cavities, lined by a semi-cartilaginous membrane, will often be found in the lungs after death. Many cases of this kind have been communicated to me since the publication of the first edition of this work; several others have been recorded in the medical journals; and I have myself collected a considerable number. To render the statements just made, more clear and intelligible, I shall now detail five cases, which exhibit instances of the facts I have related.

CASE XVII. *Ulcers of the lungs cured by transformation into semi-cartilaginous fistulæ.*— A woman, aged sixty-eight, had been for several years affected with much cough and expectoration; accompanied by habitual shortness of breath, greatly aggravated by the least exercise. In other respects she was pretty well, and was able to discharge the laborious duties of a servant. She was sufficiently stout and had a good appetite; but her lips and cheeks were of a bluish red colour. On the last day of December, 1817, she was seized with fever, very severe dyspnœa, and cough attended by very viscid frothy sputa, of a pale green colour and semi-opaque. She was bled, and thereby obtained some relief. Four days after this attack she was removed to the hospital, and presented the following symptoms on being examined by the stethoscope:—Respiration was barely perceptible to the height of about the fourth rib, and was accompanied by a well-marked crepitous rhonchus in the inferior and left part of the chest. Percussion elicited a dull sound over the same extent, especially on the back. The pulsation of the heart gave no shock, but was perceptible over the whole anterior and lateral part of the chest, and slightly on the left side of the back. The contraction of the auricles and ventricles produced a considerable sound, and nearly equally so. The external jugulars were swollen. The dyspnœa and expectoration were as stated above. On these data the following diagnostic was given: *Pneumonia of the inferior part of the left lung: slight dilatation of the ventricles.* Fresh bleedings gave temporary relief; but on the eighth day the fever increased and was attended by stupor and delirium. At this time respiration was much stronger (*cavernous*) on the upper part of the left side than anywhere else, and naturally led us to suspect the existence of pectoriloquy there; but the patient was too weak to have this tried, and died the following day.

Dissection twenty-four hours after death.—The lungs adhered to the costal pleura, nearly through their whole extent, by means of well-organised cellular substance, evidently of ancient date. The right lung was crepitous and very sound, exclusive of the upper lobe, which contained an excavation of the size of a large filbert. This was lined by a thin, smooth, equable membrane, pearl-grey, and of a semi-cartilaginous nature. Several bronchial tubes opened into this, extremely dilated, so as, at first sight, to look like appendices of the cavity. The mucous membrane of some of these tubes was very pale, and that of others red, but not swollen. The top of the left lung contained a similar cavity, only larger, being capable of containing a walnut, and more irregularly shaped. It was lined by a membrane of the same kind, which was continuous with the mucous coat of a great number of bronchial tubes, of the size of a crow-quill, which opened into it. It contained merely a small portion of nearly colourless serosity. The substance of the lungs around these cavities was sound and crepitous; except in the places where some of the projecting angles came nearly in contact, in which cases the intervening substance appeared like a compound of fibro-cartilage and black pulmonary matter. There were no tubercles whatever in the lungs; but the whole of the inferior lobes, and the lower portion of the superior, had a consistence equal to that of liver, which, when cut, exhibited a granulated surface, and poured out a purulent fluid intermixed with blood. The right cavity of the chest was larger than the left. The heart was somewhat larger than natural, and was filled with coagula. The right ventricle, in particular, was evidently enlarged, and both of these were thin, especially the right.

Case XVIII. *Ulcer of the lungs converted into a semi-cartilaginous fistula.* A man, aged thirty-two, affected at intervals during the preceding six months, with mania, was brought to Necker hospital 26th December, 1817, in a state of stupor, and died a few days afterwards. Sufficient cause of death was found in the brain. I shall only here notice the condition of the lungs. The left lung was one-fourth less than the right, and adhered by numerous cellular attachments to the pleura. It was, throughout, sound and crepitous, but contained about seven or eight tubercles of the size of hemp-seed, having a yellow and opaque speck in their centre. The right lung was in its summit attached to the pleura, by old adhesions, and contained, in this place, an excavation capable of holding an egg. This cavity, which was filled by a clot of blood, was lined by a semi-cartilaginous membrane, a quarter of a line thick, of a pearl-grey colour, and very smooth and polished, yet having little tuberosities on its surface. Several bronchial tubes of different diameters opened into it. The rest of the lung was perfectly crepitous throughout, even around the excavation, but contained an immense quantity of tuberculous granulations, of the size of millet seed at most, besides three or four other tubercles of a larger size, and already yellow, opaque, and somewhat friable towards their centre.

CASE XIX. *Ulcer of the lungs converted into a semi-cartilaginous fistula, &c.*—A woman, aged forty, had been long subject to much cough and dyspnœa, varied by temporary aggravations, especially during certain states of the weather. These symptoms, which she called asthma, had not incapacitated her for labour, until the last fifteen days, at the end of which time she came into the hospital. At this time she could not at all lie down,—the respiration was very short and difficult,—the face pallid and swollen, and the lips blue, and there was anasarca of the lower limbs. The chest yielded, on percussion, a pretty good sound throughout, though, perhaps, somewhat less than natural. Immediately below the clavicle on each side, the cylinder discovered a well-marked rhonchus. The thoracic parietes were much and forcibly elevated at each inspiration. The cough was very frequent, and followed by expectoration of opaque yellow sputa. Pectoriloquy was not discoverable. The pulse was frequent, small, and regular; the external jugulars were swelled and distinctly pulsative; the pulsations of the heart, examined by the stethoscope, were deep and regular, but affording little sound and no impulse to the ear. From this examination I thought myself justified in considering the heart as sound, notwithstanding the contrary indication afforded by the general symptoms; and accordingly gave my diagnostic—*Phthisis without disease of the heart. (Four leeches to the epigastrium; pectoral mixture.)* A few days after, the contraction of the ventricles gave some impulse, a symptom which, taken along with the pulsation of the jugulars, gave reason to suspect slight hypertrophy of the right ventricle. The symptoms, especially the anasarca, got gradually worse; and she died on the 19th of February. The day before her death evident pectoriloquy was discovered about the anterior third of the fourth intercostal space, on the right side, a point which had not been examined before.

Dissection.—The heart was of the natural size. The right ventricle was perhaps a little thicker than natural; and there was an ecchymosed spot, the size of the nail, on the inner surface of the pericardium. There was about a pint of serum in the left side of the chest, and the lung was attached to the costal pleura, at its top, by short cellular adhesions. In this point there were several radiated linear impressions depressed in the point of their union. These impressions corresponded to three or four laminæ of condensed cellular tissue traversing the substance of the lung. In the same place there was a dozen of tubercles in different stages, and one small excavation of the size of a filbert, lined by a soft membrane, and filled by softened tuberculous matter. The rest of this lung was crepitous and gorged with blood. The right lung adhered firmly, throughout its whole extent, to the costal pleura. Immediately opposite the fourth intercostal space, and at the depth of half an inch, there was a cavity the size of a walnut. It was lined by a semi-cartilaginous membrane, of the kind so often already described, and contained a small portion of a yellowish pus. A bronchial tube opened into this on the inferior side, of the size of a crow-quill, but partially obstructed by a small chalky concretion which lay loose in it. There were seven or eight similar concretions in other parts of the lung, two of which, situated immediately under the pleura, were of the size of prune-stones. The lungs were in other respects sound.

Case XX. *Phthisis Pulmonalis—cured by the conversion of an ulcerous excavation into a fistula.*—This patient was a lady, aged forty-eight, of a good constitution, and had been healthy, with the exception of a local disease, until her thirtieth year, when she became subject to very severe pulmonary catarrhs, several of which confined her to bed for two or three months, and produced considerable emaciation. Subsequently to one of these attacks she had a diarrhœa, which was at length checked with great difficulty, but her bowels continued lax for several years. After being long without an attack of catarrh, and in very good health, she was, in the beginning of 1817, attacked with a distressing cough, attended by a slight watery viscid and colourless expectoration. I saw her in July, at which time she was considerably emaciated, and, though still able to attend to her occupation, weak and languid. The pulse and skin were not uniformly febrile. Respiration was very perceptible over the whole chest, but less distinctly at the top of the right lung. From this, and the nature of the expectoration, I considered her as having tubercles in an early stage, and applied leeches, &c. The symptoms continued nearly the same throughout the summer and part of the winter. In the end of February, 1818, the cough became suddenly loose, and the patient began to have thick yellow puriform expectoration. This state of the sputa lasted a month, when the cough in a great measure left her and became nearly dry. I did not see the patient during this attack, which she looked upon as a cold; but I visited her in the beginning of April, and upon examining her chest I found most distinct pectoriloquy at the anterior and upper part of the right side. I was convinced by this that the supposed catarrh had been the discharge of the softened tuberculous matter. The sound of respiration was good over the whole chest; and even in the vicinity of the pectoriloquous spot; the pulse was not frequent and the heat moderate. On this account I entertained hopes of her recovery, and prescribed ass's milk. The cough and expectoration progressively lessened, the flesh and strength returned; and, in the beginning of July, my patient had regained every appearance of the most perfect health, although the pectoriloquy still continued most distinct, beneath the anterior part of the second rib on the right side, in a space of about an inch square. During the succeeding winter this lady had an attack of catarrh, but it lasted only fifteen days and was not severe. In other respects she bore the winter well, and she continues in good health, though still pectoriloquous in the same degree. Her pulse is rather slow, and she has little cough and less expectoration.

From considering the foregoing observations, the shape of the pulmonary fistulæ, the smooth and polished surface of their lining membrane, and the analogy of fistulæ in other parts of the body, we might naturally be led to suppose that the formation of the semi-cartilaginous membrane is the last effort of nature towards a cure, after the formation of an ulcerous excavation in the substance of the lungs, and that it is impossible for the walls of a cavity lined by such a membrane to unite and cicatrize. The following case, however, leads me to the contrary conclusion.

CASE XXI. *Semi-cartilaginous fistula of the lungs partially cicatrized, &c.*—A patient, admitted into the hospital for a diarrhœa, and who was observed during the time he remained there to have also cough and expectoration, died suddenly of apoplexy, the cause of which was found in the brain. Upon examining the chest, the right lung, at its summit, was found to adhere, by means of long cellular attachments, to the pleura. In the lateral and posterior part of the upper lobe, there was observed on the surface a deep depression, which seemed, at first sight, owing to the falling in of the walls of an ulcerous excavation, but which felt to the touch very solid and resisting. Upon dividing the lung in this point, it was found that there extended inwards from the centre of this depression, a white opaque lamina, about half a line in thickness and of the consistence of cartilage, only hardly so firm. When it had reached to within half an inch of the opposite surface of the lung, this lamina divided into two parts and then re-united, so as to leave a small cavity or cyst capable of containing an almond or prune-stone. This cavity was half-filled by a flake of tuberculous matter of a yellowish white colour, opaque, friable, much drier than tuberculous matter of this consistence usually is, but still easily recognized as such, as well by its peculiar characters, as from some specks of black pulmonary matter with which it was intermixed. The walls of this cavity, being only one-half as thick as the cartilaginous lamina with which they were connected, and of which they appeared to be a separation, were slightly semi-transparent, and exhibited the reddish tint of the pulmonary substance surrounding them. About two lines above this membrane, at the very top of the lung, there was found a portion of the pulmonary substance, about an inch square, quite indurated. This induration was occasioned by a great number of small tubercles, of a whitish-yellow colour, opaque in the centre, grey and semi-transparent towards the circumference, quite distinct from each other, and varying in size from that of a millet to that of a hemp seed. Some of them were quite white and opaque, and were beginning to soften in their centre. The intervening pulmonary substance was infiltrated by a semi-transparent sero-sanguineous and jelly-like matter, much more solid than jelly, though still very humid. *(Jelly-like tuberculous infiltration.)* Many other similar tubercles were contained in different parts of the lung, which was, nevertheless, crepitous throughout, with the exception of the indurated spot above mentioned, and a portion of the inferior and back parts, which were considerably engorged.

The left lung was charged with tubercles precisely in the same manner as the right, and contained, in the upper part of the superior lobe, a cavity somewhat irregularly shaped, capable of holding an almond in its shell. This was entirely empty, and covered by a membrane about a quarter of a line in thickness, which was smooth, even, semi-transparent, and of the consistence of cartilage, but more friable. Five or six bronchial tubes opened into this cavity, their inner membrane appearing continuous with it. The substance of the lungs around was quite sound and crepitating.*

The foregoing condition of parts appears to me evidently produced by the imperfect union of the membrane lining two sides of an ulcerous excavation, and which has been rendered imperfect by the portion of tuberculous matter still remaining in it at the period of union. This must be regarded as a very rare occurrence. It is the only one of the kind I have met with. It is, however, not at all uncommon to find in different parts of the lungs, especially in the upper part of the superior lobes, (in which situation tubercles are well known to be of most frequent occurrence,) bands composed of a condensed cellular substance, intermixed sometimes with fibrous, or fibro-cartilaginous portions which by their whiteness form a striking contrast with the natural tissue of the lungs. These bands have every resemblance to cicatrices in the pulmonary substance. Sometimes, in place of these bands, we observe masses of various size, of condensed cellular or fibro-cartilaginous tissue. Commonly, the substance of the lungs in the vicinity of these accidental productions, is much more impregnated with the black pulmonary matter than elsewhere; so much so, that it would seem as if the formation of such foreign bodies were necessarily accompanied by an extraordinary secretion of this peculiar matter, which ought not to be considered as a morbid production. The parts most deeply impregnated with this matter, are commonly more flabby and less crepitous than natural, and have intermixed with them fibro-cartilaginous bands. It is not uncommon to find in such lungs concretions of a bony or earthy nature; or a chalky substance, of the consistence of paste.

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* This excavation would have infallibly given the most perfect pectoriloquy, if it had been sought for.—*Author.*

I had often observed the above state of things without knowing to what to attribute it, and without attaching much importance to the appearance; but after I was convinced of the possibility of cure in the case of ulcerations of the lungs, I began to fancy that nature might have more ways than one of accomplishing this end, and that, in certain cases, the excavations, after the discharge of their contents, by expectoration or absorption, might cicatrize in the same manner as solutions of continuity in other organs, without the previous formation of the semi-cartilaginous membrane. In consequence of this idea, I examined these productions more closely, and came to the conclusion, that, in every case, they might be considered as cicatrices, and that, in many cases, they could hardly be conceived to be any thing else. In all such examples of supposed cicatrization, I found on the exterior of the lung, at the point nearest to such cicatrice, a depression of greater or less extent, with a hard and irregular surface, furrowed by linear marks, which sometimes exhibited an irregular net work, or embroidery, and sometimes resembled the mouth of a purse, by their common union in one central point. In the same place there are usually found adhesions between the pleura of the ribs and lungs. These depressions are found most frequently on the posterior or exterior side of the upper lobes. When they are very deep, it sometimes happens that the anterior part of the lobe, drawn upwards and backwards by the apparent loss of substance and consequent falling-in of the part, overlaps the depressed portion like the crest of a helmet. The posterior portion of the lung has sometimes the same appearance, but in a manner much less strongly marked. Whatever resemblance these *depressions* may have to cicatrices, I do not consider them as really such, but rather as analogous to those depressions met with in scirrhous mammæ, which are, in like manner, occasioned by the diseased action going on in the substance within. In the one case, the surface of the lungs, in the other the skin, is retracted by the shrinking of the subjacent parts. In carefully examining such lungs as showed similar depressions on their surface, I have invariably found, at the depth of half a line, a line, or two lines at farthest, a cellular, fibrous, or fibro-cartilaginous mass, similar to those described above. The pulmonary tissue comprehended within the depressed space, is almost always flabby, and not crepitous, even in cases where there is no sign of congestion or of impregnation with the black pulmonary matter. Every where else, however, in the vicinity of these productions, the lung is frequently quite sound. In tracing the bronchial tubes near these masses, I have observed that such as held a direction towards them, were commonly dilated. In some cases I have been able to trace them, as also bloodvessels, in the fibro-cartilaginous mass, with which, although obliterated, they formed but one substance. This fact seems to me to leave no doubt of the nature of these productions, and of the possibility of cicatrization in ulcers of the lungs. It further proves, that a bronchial tube may traverse a tubercle, and afterwards a tuberculous excavation, without being destroyed; a case, however, as we have already observed, which is extremely rare. Those wrinkled depressions, then, on the exterior surface of the lungs, are not themselves cicatrices, but the consequence of true cicatrization in the interior of the lung.

These cicatrizations, especially when complete and composed of a substance analogous to other natural tissues, produce no symptoms whatever that can denote their existence. I have only remarked in some cases, where there was reason to believe their presence, that the respiration was less distinctly audible in the supposed diseased point. In such instances also, where there is much of the black pulmonary matter intermixed, and still more where there are calcareous concretions, there is generally a slight degree of cough, and an expectoration of mucus which is very viscid, semi-transparent, and marked by dark dots.

The great number of cases, in which this wrinkling or pursing of the surface of the upper lobes has been met with in the Parisian hospitals since the publication of the first edition of this work, has induced some physicians to maintain that they do not depend on an internal cicatrice. There can be no doubt, however, of this being the fact, in the cases related by me; and I have never yet met with an example of the internal cicatrization, unaccompanied by the external depression. In respect of the cases in which a slight external wrinkling is observed without any well-marked cicatrice, I have to repeat, that it requires a good deal of attention to distinguish a cellular cicatrice amid a tissue so eminently cellular as the lungs. In cases of this kind, as in all others which require application, it is much easier not to see than to verify the fact. It is indeed true that these external depressions are very numerous, being met with in almost every case of phthisis, and in a fourth part, perhaps, of individuals dead of other diseases. But we need not be surprised at this frequency; since we know that from a fourth to a fifth part of the inhabitants of Paris die of phthisis. Besides, we have already shown, that this disease exhibits frequently successive crops of tubercles; and it is probable that the patient who at last falls a victim to it, may have got the better of several previous attacks. On the other hand, the moderate severity of the general symptoms where there exist only one or two tuberculous masses, of a small or even a considerable size, (that of a small apple, for instance,) ought to make us believe that a number of lesser-sized tubercles may form, acquire the size of a hazel-nut, soften, discharge their contents into the bronchi, and finally cicatrize, without obvious derangement of the general health. There is nothing more common than to find, in the bodies of persons dead of diseases unconnected with the chest, a small number of tubercles, sometimes of considerable size, and some of them softened and excavated, disseminated through the lungs in other respects quite sound. Nothing having, in these cases, announced the existence of tubercles, I see no reason for doubting that the same thing may occur in persons entirely healthy.* In instances of this sort, the softening of the tuberculous matter, and its evacuation by the bronchi, or by the absorbents, will be followed by a cicatrice of too small a size, in general, and too like the pulmonary tissue, to be readily and at once distinguished, especially by those who proceed to the examination with a prejudiced mind. The two following cases afford remarkable examples of this species of cicatrization.

Case XXII. *Ancient cicatrice in the lungs in a patient who died of pleurisy and peritonitis.*—A man, aged sixty-five, came into the hospital on the 29th of November, affected with slight pulmonary disorder, chiefly marked by dyspnœa, to which he had been long subject, and which he considered as asthma. Percussion afforded no result, owing to the excessive fatness of the individual; only the chest appeared to sound somewhat less below the right clavicle. Respiration was inaudible over the whole of the right side, but was puerile on the left. From these results, I considered this person as affected with a latent pleurisy of the right side of the chest. Five days after this, there was observed slight œdema of the right side of the chest; and on applying the stethoscope to the back, respiration was somewhat perceptible along the edge of the spine on the right side, though less so than on the left. There was very little cough, and scarcely any expectoration. After a few days the oppression became less, and we began to hear the sound of respiration, in a slight degree, below the right clavicle; and ægophony was perceptible in the same spot for a few days. On the 11th of December the chest sounded still better in this point, and respiration became as distinct as in the opposite side, but was not perceptible lower than the third rib: it was also sufficiently distinct between the spine and scapula. At this time the patient expectorated some opaque, yellow, puriform sputa. The symptoms continued much the same until the middle of February, when he died, apparently from an attack of peritonitis.

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* For as many as eight or ten examples of cicatrization of the lungs after tubercles, I refer the reader to M. Andral's Clin. Med. t. iii. p. 382. These cases are still more striking than those recorded in the text; and, together with them, put the fact of the healing of individual tuberculous excavations, at least, beyond all question. At the same time, I am of opinion, that M. Laennec has exaggerated the frequency of cases of this kind; and has considered certain appearances as signs of cicatrization, which were probably owing to other causes. I think it not unlikely that simple pneumonia, or pleuro-pneumonia, and indeed other and less severe diseases, may give rise to many of the slighter deviations from the natural structure considered by him as tuberculous cicatrices. On this point the following statement of M. Louis is important: "I have not met with any of those masses of condensed cellular substance in the upper lobes, in which bronchial tubes, more or less enlarged, are seen to terminate, and which M. Laennec looks upon as cicatrices of tuberculous excavations. The depressions on the surface of the same parts, around which the substance of the lung is found pursed or wrinkled, have not appeared to me to be owing to any determinate lesion.—I have frequently observed them in cases where the lung was quite sound, or only slightly indurated to a small depth immediately beneath the pleura. I have also found them sometimes when there existed in the summit of the upper lobe, tubercles still unsoftened, small excavations, or bony concretions."—Recherches, p. 36.—*Transl.*

Dissection twenty-four hours after death.—The cavity of the right pleura contained about a pint of yellow and somewhat turbid serum. The lung of the same side adhered to the diaphragm and posterior part of the chest, by a strong, short, and well-organized cellular tissue. On the anterior surface of the lung, about its middle, there was a false membrane, about the size of the palm of the hand, soft, opaque, yellowish, of a consistence inferior to that of half-concrete albumen, and appearing, at first sight, like the matter of thick puriform sputa. This patch was traversed by numerous blood-vessels, and adhered to the costal pleura by a lamina of greater consistence, also very vascular, and approaching more to the texture of cellular membrane. Above and behind, another firm albuminous crust, yellow and vascular, attached the lungs to the pleura. The substance of the lung was sufficiently crepitous in the upper half, although somewhat injected with a bloody serum. Its lower portions were more compact, of a deeper red, and in spots somewhat granular on incision; it was also gorged with bloody serum, and less crepitous than the upper parts. The left lung adhered to the pleura, at its summit, by no means of old cellular attachments. In this point there was an irregular depression, in the centre of which lay a small ossification. From this spot could be traced into the substance of the lung, a band of very white cellular tissue, very dense, yet scarcely amounting to the consistence of a membrane. This band was about an inch long, six lines broad, and three or four thick. Its white colour formed a striking contrast with the natural pulmonary tissue. Some bronchial tubes of the size of a crow-quill, or larger, terminated and became lost in this band,—which an accidental circumstance prevented me from examining more minutely. The pulmonary substance was crepitous throughout, and there were no tubercles in either lung. The pericardium contained a few ounces of limpid serum, and the heart was larger than the hand of the individual. The walls of the left ventricle were about eight lines thick at the origin of the columnæ, and six lines at the base and were very firm; the cavity of the ventricle was very small.* The right ventricle seemed small, and its parietes were of natural thickness. The peritoneum was inflamed, and its cavity contained coagulated lymph and serum.

CASE XXIII. *Ancient fibro-cartilaginous cicatrice of the lung in a person who died of pneumonia.*—A man, aged sixty-two, had been affected five years with an habitual cough, but was otherwise of a good constitution. On the 4th of April, 1818, he was suddenly seized with acute pain in the lower part of the left chest, which soon extended over nearly the whole side, attended by difficult and painful respiration, and inability to lie on the affected part. He came into the hospital on the 8th, and exhibited the following symptoms:—general paleness, left cheek slightly coloured; lips bluish; external juglars swelled; pulse weak and frequent; breathing short, loud, and painful, and with open mouth; cough not very frequent and by fits; expectoration scanty, the sputa very viscid, frothy, semi-transparent, and intermixed with some yellow and opaque matters. Percussion yielded a very good sound on the right side, but was not so good on the left. Respiration was quite inaudible in almost the whole extent of the left side, whilst on the right it was strong, and attended by a rhonchus and sort of hissing sound. The pulsations of the heart were regular. The contraction of the ventricles yielded a very dull sound, and a slight impulse; that of the auricles was sonorous and heard distinctly below the clavicles. The paleness of this man, and the cough to which he had been so long subject, leading to the suspicion of tubercles, we examined the chest in several points with the view of discovering pectoriloquy, but did not find it: we did not examine with this view, however, the top of the shoulder, on account of the patient's weakness. From these results the following diagnostic was (provisionally) made: *Pleuro-pneumonia of the left side. Tubercles? Slight dilatation of the heart?* This man died the following night.

Dissection thirty-six hours after death.—The left cavity of the chest was larger than the right. The right lung adhered, throughout, to the pleura by means of ancient attachments. On its upper part there was a fibro-cartilaginous mass, covering the lung somewhat like a cap. It was three lines in thickness in its centre, and formed, in this point, the medium of adhesion to the ribs. At the level of the second rib, it insensibly vanished in the pleura. The substance of the lung was very crepitous anteriorly, but little so posteriorly, in what part it was flaccid and much injected by very fluid blood. This lung was also marbled by a great number of spots formed by black pulmonary matter.

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* This well-marked case of hypertrophy had not been suspected, although the heart had been examined several times by the stethoscope, owing to the existence of the disease in the lungs, which masked the symptoms.—*Author.*

In the same lobe, included in the pulmonary tissue and strongly adhering to it by continuity of substance, there was found a fibro-cartilaginous mass of a similar kind, of the size of a walnut, and of an irregular conic shape. This mass was of a brilliant white colour, and opaque, and formed a striking contrast with the surrounding pulmonary tissue, which contained an unusual quantity of the black matter. That part of the pulmonary substance interposed between it and the superficial mass, about two lines in thickness, was quite black, and destitute of air, although its natural texture was very perceptible. This fibro-cartilaginous mass, when cut into, presented all the characters of a pulmonary cicatrice. In one or two small portions of it, the texture was softer, somewhat cellular, and charged with a transparent serum. Several bronchial tubes terminated and were obliterated in its substance. Two, especially, which terminated in it, in forming a cul-de-sac, were of the size of a goose-quill. One of these, after forming a cul-de-sac, of a diameter of two lines, became all at once contracted to a size scarcely equal to a crow-quill, on entering the tumour, into which it could be traced half-an-inch. In this tract, however, its cavity was entirely obliterated, and it resembled in colour and texture the tumour, from which it was only distinguished by the direction of its fibres, or by a slight shade of colour which pointed out both its coats and its obliterated canal. In the superior lobe of the left lung there was a small cavity capable of containing a filbert, lined by a fine semi-transparent membrane, of a semi-cartilaginous consistence, and through which the black pulmonary matter could be distinguished. This excavation contained a small quantity of tuberculous matter, friable, and of the consistence of soft cheese. The pulmonary tissue amid which it was placed was perfectly sound and crepitous. Near the origin of the bronchi was observed a single tubercle of the size of a barley-corn, softened to the consistence of soft cheese, and surrounded by a dense membrane, greyish and semi-transparent, of the nature of the bodies termed imperfect cartilages. In its anterior quarter, the left lung was crepitous, but the remaining part was of the consistence of liver. The base of this lung adhered to the diaphragm by its whole border; and in its centre there was a patch of concrete lymph of the consistence of white of egg. It was easily separated from the pleura of the lungs, which appeared redder than natural. The inner surface of the pericardium, where this membrane is attached to the diaphragm, was of an intense punctuated red for the space of a square inch. The pericardium contained about two ounces of very bloody serum, and two or three flakes of half-concrete lymph. The heart was larger than the hand of the subject, and exhibited on its anterior surface a white spot of a cellular character, of the size of the nail. The right ventricle was larger than natural, of the usual thickness, but yellowish and of a flaccid texture. The left ventricle was evidently dilated, and it was only four or five lines thick; its texture was soft and pale like the right.

The foregoing cases prove, I think, that tubercles in the lungs are not in every case a necessary and inevitable cause of death; and that a cure may take place in two different ways, after the formation of an ulcerous excavation:—first, by the cavity becoming invested by a new membrane analogous to some of the textures of the healthy body; and secondly, by the obliteration of the excavation by means of a cicatrix, more or less complete, consisting of cellular, fibrous, and cartilaginous substance. The identity of the excavations observed in the 17th, 18th, 19th, 21st, and 22nd cases, leaves no question that they had one and the same origin, namely, the softening and discharge of the tuberculous matter originally contained in them. The 17th case may be considered as affording an example of a perfect cure, since no more tubercles existed in the lungs. The same may be said of the 23rd,—inasmuch as there was only one very small tubercle in the lungs. The subjects of the 18th, 19th, and 21st cases would, no doubt, have had relapses of their disease, since their lungs all contained tubercles more or less advanced, and which must necessarily have been eventually developed. This development, however, might have been remote; since it has been truly shown by M. Bayle, that crude, and still more, miliary tubercles, continue to exist for a great many years without materially affecting the general health. Were it in our power to ascertain the previous history of such cases as exhibit these cartilaginous excavations and cicatrizations in the lungs after death, we should, in all probability, find that the patients had been subject to a long-continued cough, and severe catarrh, or even to a disease considered at the time as true consumption, and which had been very unexpectedly cured.* These morbid appearances, at least sufficiently explain the fact of the seemingly intermittent character of certain cases of consumption, and the extraordinary cure of others.

These pulmonary fistulæ and cicatrices are very common, as any one will be convinced who practises morbid dissections in an hospital for any length of time. I have only mentioned a few of those I have met with lately; and, indeed, it is only lately that I have paid any minute attention to such appearances. I had, however, frequently met with them long before, and have, indeed, partly described them in another place.† They are very various in their appearance; and it would seem that it is especially by the production of this adventitious cartilaginous tissue that nature attempts a cure of tuberculous excavations. With this end she seems occasionally to throw out a superabundance of it; as the exterior portion of the lung is sometimes coated with it, as in one of the cases already detailed. On other occasions the cartilaginous walls of the cavity are observed of very unequal thickness,—as thick in some places as half-an-inch or an inch,—as if the remedial powers of nature were undetermined whether to form a perfect cicatrix or only a fistula.

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* I am aware that phthisis may be closely simulated by a common catarrh. I shall notice a case of this kind hereafter, (the only one I have ever met with,) and M. Bayle details two in his work, viz. cases 48 and 49.—*Author.*

† Dict. des Scienc. Med. Art. *Cart. Accident.*

Very frequently the production of these accidental cartilages is accompanied or followed by a copious formation of phosphate of lime in their vicinity. It is, however, uncommon for these fistulous cysts to ossify, although I have mentioned an instance of the kind; but they frequently contain the salt just named in an earthy form, and humid. Still more frequently, the substance of the lungs is infiltrated with the same (more or less dry, and mixed with black matter) in the points formerly occupied by tubercles. Sometimes we find a few small tubercles, the product of a previous eruption, some of which are crude or in different degrees of softening, others more or less completely destroyed by absorption, and replaced by the earthy phosphate, which would seem to have been deposited in proportion as the tuberculous matter was absorbed.*

The merely temporary cure of many phthisical cases is readily explained, as above remarked, by the cicatrization of a softened tubercle, and by the eventual softening of others which were only in their first stage at the period of the cicatrization of the first. For example, we can easily fancy that the subject of Case XXI. detailed above, had he not been carried off by another disease, might, after the perfect cicatrization of the cavity in the right lung, have enjoyed tolerable health for several years, until the ultimate maturation of the miliary tubercles, which, sooner or later, must inevitably induced phthisis.

I had occasion in the year 1814 to see a remarkable instance of this temporary cure of consumption.

CASE XXIV.—M. Recamier and myself were consulted by a young lady who had every symptom of pulmonary consumption, such a frequent cough, purulent expectoration, much emaciation, hectic fever, and night sweats. Several of the lymphatic glands of the neck were swollen, and for a few days she had been affected with very severe diarrhœa. Astringents, sulphur baths, and asses' milk were prescribed; and were followed by such success that, in the course of two months, her strength, flesh, and colour, were quite restored, the cervical glands were diminished one-half, and in short, she was in a state of perfect health. She passed the winter very well, but in April the cough and all the other phthisical symptoms returned, and she died in the end of the summer.

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* It is the observation of this fact that has led M. Andral to admit two terminations of the solid tubercle—the purulent and cretaceous. This last transformation is effected, he says, by the subtraction of the animal matter which constitutes the greater portion of tubercle, and by an augmentation of the calcareous secretion. In support of these views he cites the analysis by M. Thenard of the matter of crude tubercles, and of tubercles which had undergone the calcareous transformation. The first gave—animal matters, 98. 15; muriate of soda, phosphate and carbonate of lime, 1. 85; oxide of iron, a trace;—the second gave—animal matters, 3; saline matters, 96.—(*Precis. d'Anat. Path.* t. i. p. 417.)—(*M. L.*)

Such examples of a perfect though only temporary cure of consumption are rare: but it is by no means unusual to find persons affected with all the symptoms of this disease surviving for many years, alternately experiencing imperfect convalescences and relapses more or less severe. It is such cases M. Bayle had in view when he said consumption may continue forty years. These imperfect cures may, I think, be attributed to the successive softening of several tubercles, and their subsequent conversion into fistulæ; whilst the more perfect, though still temporary cures, may depend on the formation of a cicatrix. The results of these two kinds of cure, as far as I am able to judge from the cases I have met with, seem to me to be the following:—the cure by fistulæ usually leaves behind it a chronic catarrh, more or less severe, and is accompanied by an expectoration which is sometimes very copious; cicatrization, on the contrary, produces no other inconvenience than a dry cough, neither frequent nor severe. Sometimes, indeed, there is no cough, especially where the texture of such cicatrices closely resembles that of other natural tissues in the animal economy, especially the cellular or fibro-cartilaginous. When, however, the substance of the cicatrice is less perfect and more remote from the healthy tissues of the body, and when it is impregnated with much of the black pulmonary matter, as in Case XXIII, we find an habitual cough, either dry or accompanied by a mucous expectoration, and cachetic condition of the body, even after the complete destruction of the tubercles.

When we consider that the formation of tubercles in the lungs seems usually to be the consequence of a general diathesis; that these are frequently found contemporaneously in the intestines, where they ultimately occasion ulceration and colliquative diarrhœa; and that, in some cases, also, they exist in the lymphatic glands, the prostate, the testicles, the muscles, bones, &c.; we must be led to believe the most perfect cure that can take place in consumption as merely temporary. Admitting, however, the justness of this conclusion in those extreme cases of tuberculous diathesis, (which, after all, are but rare when compared with the vast number of consumptions,) we are still entitled to hope for the cure of many cases of phthisis, or at least, for such a suspension of their symptoms as may be deemed almost equal to a cure, as the individuals may enjoy such a state of health, as may enable them to fulfil all the duties of civil life, for several years, or until a fresh development of tubercles produces a fresh and final seizure. It is further worthy of remark, that, although in the majority of the subjects in which I have observed these fistulæ and cicatrices, the lungs contained tubercles in different stages of their progress, and, consequently, a certain though perhaps remote cause of a return of the disease, still I have found the same marks of a cure in subjects in whom there were no tubercles whatever, either in the lungs or in any other organs. Cases XVII and XXIII afford examples of this fact. In such instances it may be supposed, perhaps, that the excavations had been the product of simple inflammation of the pulmonary tissue, and not of tubercular degeneration. Such a supposition is, however, quite gratuitous. Those accustomed to much morbid dissection have almost daily experience of the formation of these cartilaginous membranes on the surface of tuberculous excavations, while the collection of pus, or true abscess of the substance of the lungs, is so extremely rare (as we have already seen, when treating of pneumonia) as to be justly esteemed one of the most extraordinary appearances in morbid anatomy, and, therefore, quite inadequate to account for an occurrence so common as that of fistulæ and cicatrizations of the lungs.

These considerations ought to induce us still to entertain some hope in those cases of consumption wherein we have reason to believe, from the result of percussion and of our exploration with the stethoscope, that the greater portion of the lungs remains still permeable to the air. Although we are, therefore, certain, that a subject that is pectoriloquous has an ulcerated cavity in the lungs, we are not, on this account, equally certain that this will prove the cause of death. We may even be justified in believing that a case, wherein all the ordinary symptoms of consumption exist *together with pectoriloquy*, is more favourable than one in which they exist without this peculiar phenomenon; since, in the first case, we may attribute the symptoms to the efforts of nature in maturing and evacuating the tuberculous matter, and may hope for their cessation when this is effected, provided the greater portion of the lungs is in other respects healthy; while, in the second case, we must imagine that the tubercles are very numerous, since they produce such violent general effects previous to the period of their softening, and that, therefore, they will, in all probability, occasion death before the epoch of possible cure arrives.

I regret that it was not in my power to lay before the reader any account of the diseases which had produced the cicatrices or fistulæ observed in the subjects of the 17th, 18th, 19th, 21st, 22nd, and 23rd cases; but I am enabled to detail two others, which, as well as 21, seem to be a counterpart of the former.

CASE XXV. *Tuberculous phthisis cured.*—An English gentleman, aged thirty-six, detained in Paris as a prisoner of war, in September, 1813, had an attack of hæmoptysis, followed by a cough, at first dry, but, in the course of a few weeks, accompanied by a purulent expectoration. To these symptoms were added a well-marked hectic, considerable dyspnœa, copious night sweats, emaciation, and great debility. The chest sounded well every where, except under the right clavicle, and in the axilla of the same side. The hæmoptysis returned in a slight degree, now and then, and in December he had diarrhœa, which was with difficulty checked by astringents. In the beginning of January he was so much reduced, that both M. Hallé and Bayle agreed with me in opinion, that his death might be daily looked for. On the 15th of January, during a severe fit of coughing, and after bringing up some blood, he expectorated a solid mass, of the size of a filbert, which, on examination, I found to be evidently a tubercle in the second stage, surrounded, apparently, by a portion of the pulmonary tissue, such as has been already described as impregnated with grey tubercular matter in the first stage, often met with around these bodies when large. This patient remained in the same degree of extreme emaciation and debility all January, being expected to die daily; but in the beginning of February the perspirations and diarrhœa ceased spontaneously, the expectoration sensibly diminished, and the pulse, which had been constantly as high as 120, fell to 90. In a few days the appetite returned, the patient began to move about in his room, his emaciation became less, and, against the end of the month, his convalescence was evident. In the beginning of April he was perfectly recovered; and his health has continued good ever since, without even the least cough, and without his being at all particularly guarded in his climate or regimen. In 1818 this patient again consulted me for a different complaint, and I took the opportunity of examining his chest by means of the stethoscope. The only thing I could detect, was the comparative indistinctness of respiration in the superior portion of the right lung, as low as the third rib. This part, however, sounded as well on percussion as the opposite side, and there was no pectoriloquy. From these circumstances, I am of opinion, that the excavation which contained the expectorated tubercle, must have been replaced by a cellular or fibro-cartilaginous cicatrice; and as the total absence of cough, dyspnœa, and expectoration, for so long a period, forbids the supposition of the existence of others in the lungs, I think we have a right to consider this patient as perfectly cured. In 1824, this gentleman was examined at Rome by Dr. Clark, an English physician, who practises there with great distinction, and who recognized him as the subject of the case just detailed. I saw him also the same year, and found him precisely in the same state as in 1818.*

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* I learn from Dr. Clark, who is now resident in London, and whom the English reader will identify as the distinguished author of *The Influence of Climate*, that Mr. G. is still living, (1827,) in good health. Several well-marked cases of expectorated tubercle are on record. A very remarkable instance is mentioned in the

CASE XXVI. *Phthisis pulmonalis cured.*—This case is detailed in M. Bayle's treatise, (see Case LIV,) and is that of a gentleman who, after having experienced all the symptoms of consumption in the greatest degree, perfectly recovered by change of air, and living by the sea-side. As both M. Bayle and myself (for this was my patient) then considered the cure of phthisis impossible, we considered the case as one of chronic catarrh, and it is so entitled in M. Bayle's book. Since then I have had an opportunity of satisfying myself, by means of the stethoscope, that our patient had had more than a mere catarrh. His respiration is quite perfect throughout the whole chest, except at the top of the right lung, in which point it is totally wanting. On this account, I am certain that this portion of lung had been the seat of an ulcerous excavation, and that this had been replaced by a complete and solid cicatrice. The health of this gentleman continues good, although he has often occasion to speak in public. He has sometimes a little dry cough, on the change of weather, but takes cold very seldom.

I here terminate what I had to say respecting the possibility of curing phthisis pulmonalis. I hope the importance of the subject will be considered as sufficient excuse for the great length of my dissertation. In regard to the facts adduced by me in proof of the curability of this disease, I am of opinion that any attentive observer who shall choose to employ the same means, viz. auscultation and dissection, will frequently meet with similar results. My experience leads me to deem such cases to be extremely common: those related above occurred to me in the course of some months; and I have since met with many others. I formerly stated that I had often previously observed similar appearances, without paying much attention to them; and I may here add, that, in the natural sciences, when our attention is not particularly directed to certain objects, we may meet with them every day without observing them. A gardener is seldom able to discriminate the tenth part of the plants which spring on the very soil which he is cultivating; and an anatomist may know nothing of the organic changes which occur in the human body (though he sees them every day) while engaged in tracing the blood-vessels or nervous filaments. I myself can bear witness, from personal experience, that it is quite possible for one to forget, in part, descriptive anatomy, although in the daily habit of opening dead bodies. To conclude, I think that the cure of consumption, where the lungs are not completely disorganized, ought not to be looked upon as at all impossible, in reference either to the nature of the disease, or of the organ affected. The pulmonary tubercles differ in no respect from those found in scro-

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Journ. de Med. t. 78, for March, 1789. In this case also, the patient recovered, although previously on the brink of the grave.—*Transl.*

phulous glands; and we know that the softening of these latter is frequently followed by a complete cure. On the other hand, the destruction of a part of the substance of the lungs is by no means necessarily mortal, since we know that even wounds of these organs are frequently cured, notwithstanding the unfavourable condition with which they are necessarily complicated by the perforation of the walls of the chest, and the admission of air into the pleura.

SECT. IV.—*Occasional causes of phthisis.*

I have already answered in the negative the question as to whether consumption is the result of the inflammation of any of the constituent textures of the lungs. Cold is generally admitted as one of the most powerful occasional causes of phthisis; and it is certain that this disease is extremely common in the north of Europe and America. It is to be remarked, however, on the one hand, that in northern countries the inhabitants suffer less frequently from cold than in temperate climates, owing to the warmer clothing and houses of the former, which the severity of the winter obliges them to adopt; and, on the other hand, that the complaint is very rare among the natives of high mountainous countries, particularly the Alps, whose winters are as long and severe as those of the north of Europe. The disease is also very common in temperate countries, as in France, in the north of Spain, of Italy, and Greece. It appears to be somewhat less frequent in the most southern parts of Europe, and still less so in the countries between the tropics.* In respect of the last-

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* The calculations made respecting the relative prevalence of phthisis in different places, have hitherto been founded entirely on the disease in an open form; but it is frequently latent; and it is not impossible that it may hereafter be found that it is more frequently manifest in cold climates, and commonly latent in warm.—*Author.*

Although not without voluminous documents relating to the degree of prevalence of consumption in all the countries in Europe, and in many parts of Asia, Africa, and America, I think I may venture to assert, that we are still destitute of data sufficiently accurate and extensive, to enable us to come to such conclusions on this point, as will satisfy a philosophical mind. This much, I think, appears to be made out—that in the most northern parts of Europe, particularly Russia, and yet more between the tropics, the disease is considerably less prevalent than in the more temperate climates. Rates of prevalence for the different countries of Europe, and for different parts of the same country, have been drawn out by many authors, and are to be met with in most recent works on phthisis; but I have no hesitation in stating, that they are very little entitled to our confidence;—not from any inaccuracy or incompetence of the calculators, but from the almost insurmountable difficulties of the subject, in the present extremely imperfect state of our medico-statistical knowledge. One thing, at least, is certain, that the disease is extremely prevalent in every part of Great Britain, Germany, France, Italy, Spain, and in the islands and on all the coasts of the Mediterranean sea. Our author is fond of considering maritime situations as much less liable to the disease than the interior of countries; but we have no positive proof of this. In England, at least, I can state, from a long residence on the southern coasts, that consumption is extremely prevalent there.—For such imperfect documents as we possess on this most important subject, I refer to the au-mentioned countries, however, it is to be observed, that the parts of them best known to us, are on the sea shore; and we shall see presently that there is a very great difference in this respect between coasts and the interior of countries. Too light clothing, or the impression of cold, when the body is heated, seems in our cities to be the occasional cause of phthisis, in many young women, whose disease begins, or at least the severer symptoms of it, with a pulmonary catarrh, a pneumony or pleurisy.* Independently of temperature, locality has no doubt an influence on the production of phthisis. It is, for example, more common in large cities than in small ones, and more frequent in the latter than in the country. The ancients had, in all probability, already remarked that it was less common in maritime situations, since they recommended sailing to their phthisical patients. This circumstance, which had been too long overlooked, has of late years justly attracted the attention of the English physicians, and they are now in the constant habit of sending their consumptive invalids to Madeira.† I have myself paid particular attention to this subject, and in the absence of exact numerical calculations, which could only be procured with much time and labour, I am glad to be able to lay before the reader some materials which I have obtained from a great number of medical men, who are at present resident, or who had been long resident, on the coast, and which must be considered as very valuable, although possessing only an approximate exactness. Most of the naval surgeons whom I have had an opportunity of conversing with, have informed me, that they had scarcely ever known a man become phthisical in the course of a long voyage, and that they had frequently seen sailors, whose chests seemed seriously affected at the time of putting to sea, return perfectly well, or with their health singularly improved.‡ On the south coast of Bretagne the proportion of deaths from phthisis seems to be but about one in forty; and on the north coast of the same province, as well as

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thors mentioned in a former note, and also to the more recent works of Sir Alexander Crichton and Dr. James Clark.—*Transl.*

[*] But these causes give rise much more frequently to severe catarrhs, pneumonies and pleurisies, which are not followed by the tubercular disease; so that, as I have formerly observed, we may conclude, that phthisis when it follows the diseases just mentioned, has been merely accelerated by them, the tubercles having previously existed.—*Author.*

[†] I need hardly inform the reader that this statement is overcharged. Some patients are certainly sent to Madeira every year; but the number is by no means great;—certainly very far short of the number sent to the south of France and Italy, although its climate is certainly very superior to that of any European country. It must not be concealed, however, that consumption is very prevalent at Madeira. For all the valuable information we possess on this subject I refer the reader to Dr. Clark's admirable work *On the Influence of Climate.*—*Transl.*

[‡] My own experience is not in accordance with this statement, nor is, I fear, that of most English naval surgeons. See the valuable works of Blane, Trotter, Johnson, Burnett, &c. See also a Thesis by Dr. Sinclair, "De impetu maris Mediterranei," &c. Edin. 1817.—*Transl.*

on that of Normandy, it is only one in twenty,—at least in the country and small towns. In Paris, and the great cities in the interior of France, the proportion is well known to be as great as one in four or five.* The disease appears more frequent on the coasts of England and northern parts of Europe; and seems also to be more prevalent, *ceteris paribus*, on the shores of the Mediterranean, than on those of the main ocean. The influence of the sea air appears to be felt only a small distance from the coast, and is greater in proportion as we approach this. I have myself attended carefully to this point of medical statistics, during the two years which I have been obliged to spend in the country, on account of ill health, since the publication of my first edition. During this time I resided in Bretagne, on the shores of the bay of Douarnenez, in the parish in which the small town of the same name is situated. The population of this parish is about four thousand, and the ordinary annual mortality about one hundred and forty. During the two years above mentioned, I only saw six cases of phthisis, of which number three were cured; and from the information I received on the spot, I do not think that the annual mortality from this disease can be rated at more than three. This statement is the more remarkable, as there are included in the number of inhabitants above mentioned, about six hundred seamen, one-half of whom, at least, had been detained for several years prisoners of war in England.† A great number of these men had for several years been affected with constitutional syphilis, which had been kept at bay by a repeated palliative treatment; and although we have no positive proof that this state of disorder is capable of causing phthisis, it is well known that it is so considered by many practitioners; and it is even probable that an inveterate syphylis and the treatment generally had recourse to for its removal, may prove an occasional cause of it.

Hæmoptysis is commonly regarded as one of the most frequent causes of consumption. I did not take any notice of this affection when considering the question of the production of tubercles by inflammation; because the congestions which give rise to hæmorrhage, not having any tendency to produce pus, I do not consider them as being truly inflammations. The common opinion on this point has no further foundation than what is supplied by the axiom—*post hoc ergo propter hoc*. It is indeed true that the first symptom of an alarming kind in the greater number of phthisical patients is hæmoptysis; but if we examine the chest at this time, we shall frequently detect the presence of tubercles in the lungs. And when we consider this, and know that the hæmorrhage will probably return again and again in the progress of the disease, we are justified in concluding that tubercles in the lungs are the most frequent cause of hæmoptysis. Indeed it is easily conceived how this is so; since these foreign bodies, in their development, must compress and irritate the pulmonary tissue, like the thorn of Van Helmont. On the other hand, we have no positive proof that hæmoptysis, by itself, is capable of giving rise to tubercles; and, indeed, considered anatomically, it is not easy to conceive how it could do so. If such were the case, we should find the hæmoptysical engorgement gradually transformed into miliary tubercles: and this I have never seen.* It is, moreover, worthy of remark, that a hæmoptysis produced by violence, as by a blow on the chest, violent running, a fit of passion, immoderate exercise of the voice, &c. is most commonly productive of no further consequences, when it is once got under; whilst phthisis frequently supervenes immediately to a hæmorrhage arising without any obvious cause, but which, no doubt, has for its real cause, tubercles which had previously, and perhaps for a long time, been latent in the lungs.†

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* The average number of deaths from consumption in the following towns in England, viz. Bristol, London, Warrington, Chester, Shrewsbury, Plymouth, Ackworth, and Holy Cross, from documents given in Dr. Woollcombe's work, is more than one in four. Dr. Young says, that the proportion of deaths for the whole of Great Britain is one-fourth.—*Transl.*

† No such observations have been made at Brest, which is only seven leagues from Douarnenez, and the population of which consists almost exclusively of seafaring people. On the contrary, consumption is there almost as frequent as in Paris. —(*M. L.*)

Among the occasional causes of phthisis, I know of none more assured operation than the depressing passions, particularly if strong and of long continuance; and it is worthy of remark, that it is the same cause which seems to contribute most to the development of cancers, and all the other accidental productions which are not analogous to any of the natural tissues. This is perhaps the only cause of the greater frequency of consumption in large cities. In these, the single circumstance of the inhabitants having more numerous relations with one another, is in itself a cause of more frequent and deeper vexation; while the greater prevalence of immorality of every kind, is a constant source of disappointment and misery, which no kind of consolation, and not even time itself, can effectually remove. I had under my own eyes, during a period of ten years, a striking example of the effect of the depressing passions in producing phthisis; in the case of a religious association of women, of recent foundation, and which never obtained from the ecclesiastical authorities any other than a provisional toleration, on account of the extreme severity of its rules. The diet of these persons was certainly very austere, yet it was by no means beyond what nature could bear. But the ascetic spirit which regulated their minds, was such as to give rise to consequences no less serious than surprising. Not only was the attention of these women habitually fixed on the most terrible truths of religion, but it was the constant practice to try them by every kind of contrariety and opposition, in order to bring them, as soon as possible, to an entire renouncement of their own proper will. The consequences of this discipline were the same in all: after being one or two months in the establishment, the catamenia became suppressed; and in the course of one or two months thereafter, phthisis declared itself! As no vow was taken in this society, I endeavoured to prevail upon the patients to leave the house as soon as the consumptive symptoms began to appear; and almost all those who followed my advice were cured, although several of them exhibited well-marked indications of the disease. During the ten years that I was physician of this association, I witnessed its entire renovation two or three different times, owing to the successive loss of all its members, with the exception of a small number, consisting chiefly of the superior, the grate-keeper, and the sisters who had charge of the garden, kitchen, and infirmary. It will be observed, that these individuals were those who had the most constant distractions from their religious tasks, and that they also went out pretty often to the city, on business connected with the establishment. In like manner, in other situations, it has appeared to me that almost all those who became phthisical, without being constitutionally predisposed to the disease, might attribute the origin of their complaint to grief, either very deep or of long continuance.* Severe continued, or intermittent fevers, would seem to be pretty often the occasional cause of the production of tubercles; since it is not unusual to find, on examining the bodies of those who have died of these affections, a certain number of tubercles, sometimes pretty large, in the lungs or bronchial glands, and more particularly in the latter. It is, however, probable, that eruptions of tubercles of this kind are almost always of small extent, and rarely succeeded by others, and that they terminate favourably by the absorption or evacuation of the tuberculous matter; since it is incomparably more rare to find phthisis supervening to fever, than to find tubercles in the lung of those who die of this disease.

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* M. Andral gives (*Clin. Med.* t. iii. p. 39) a case which, in his opinion, proves the possibility of this transformation. In the lungs of a man afflicted with chronic peritonitis, and who had latterly been subject to severe hemoptysis, several masses of pulmonary apoplexy were found, one of which *contained a considerable number of granulations of a yellowish white, having all the characters of incipient miliary tubercles; others consisted of a more fluid matter resembling drops of pus.* The latter part of this statement and the yellowish colour of the solid granulations evidently prove, in my opinion, that what M. Andral took for incipient tubercles, were of long standing and partially softened. It is therefore more than doubtful that they were developed after the hemoptysical engorgement, and it is even much more probable that they constituted its occasional cause.—(*M. L.*)

† The testimony of M. Louis is most strong in support of our author's opinion that hæmoptysis is the consequence and not the cause of tubercles. He says, that during the last three years he had interrogated all the patients that came under his observation as to their having ever spit blood, and was always answered negatively, except by some men who had received blows on the chest, and women who had laboured under suppression of the menses. He adds, that with these exceptions, this symptom "indicates in a manner infinitely probable the presence of tubercles in the lungs." *Recherches*, p. 194. Andral says, that his experience leads him to conclude that of persons who have had hæmoptysis, one-fifth part have not tubercles in the lungs, and that of those who die of phthisis one-sixth do not spit blood at any period of their disease. *Clin. Med.* t. iii. p. 181. Every English reader is aware of the opinion of Dr. Cullen, and many preceding writers, that consumption is the effect of hæmoptysis, an opinion which would seem to be still the prevailing one in this country.—*Transl.*

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* This is a most singular history. It is to be regretted that the author has not been more particular in his details as to the number of the sisters, &c. &c. Such a statement requires every confirmatory document. The influence of the depressing passions in giving rise to diseases of the lungs, and particularly phthisis, has been noticed by many writers. It is well known that Morton has entitled one of his

Tubercular consumption has long passed for a contagious disease, and it is still looked upon as such by the common people, by magistrates, and by some medical men, especially in the southern parts of Europe. In France, at least, it does not appear to be contagious. We frequently observe, among the poorer classes, a numerous family sleeping in the same apartment with a consumptive patient, and a husband occupying, to the last, the same bed with his wife, without any communication of the disease. The woollen apparel and the beds of consumptive subjects, which it is the custom to burn in some countries, are not generally even washed, much less destroyed in France, and yet I have never seen the disease communicated by them. It would be well, nevertheless, were it merely on the score of prudence and cleanliness, that greater precautions were taken in this respect. It is well ascertained that a disease, not usually contagious, may become so in certain circumstances.* Is it pos-

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species of consumption "Phthisis a Melancholia." In many parts of his *Phthisiologia*," this author's opinion respecting the great effect of mental causes in producing this disease, is strongly expressed:—"Causa vero horum tuberculorum usitissima, est contractio pulmonum leviter spasmodica, diuturna, et continua, cum ponderis et oppressionis sensu, a mœstitia, timore, curis, cogitatione intensa, atque aliis ejusmodi animi pathematis effecta." *Phthisiologia*, p. 99. "Ita etiam iste morbus (phthisis) eos, ut plurimum, ex infortunii alicujus occasione corripit quæ res metum, mœstitiam, cogitationem, vel aliquod aliud gravius animi πάθημα, idque diuturnum et fixum prius inducit." Ib. p. 130. "Insuper, pathemata animi graviora, ut plurimum hystericam et hypochondriacam affectionem, præcedere, vel saltem comitari, omnibus est notum: A quibus sæpius quam a frigore, vel aliqua alia de causa originem suam ducere solet." Ib. p. 242. In relation to this subject, the observations of Avenbrugger respecting the effect of *nostalgia* in producing diseases of the chest, are highly worthy of attention. See Corvisart's Avenbrugger, p. 170, or my translation of the same work, p. 24.—*Transl.*

* The contagion of phthisis, like that of many other diseases, which are supposed to be conveyed by an invisible medium, will in all probability remain for ever a contested point. The opinion of the great majority of medical men in this country is opposed to contagion; and I think this opinion is justified equally by statistical facts, by the truths of pathology, and by analogical reasoning. For a strong statistical argument against the doctrine of contagion, see Dr. Young's Treatise on Consumption, p. 46. Although myself sceptical as to the contagious powers of phthisis, from never having witnessed, among the thousands of cases of this disease I have attended, one unequivocal instance of the fact, it must be admitted that the thing is in itself neither impossible nor even improbable. It is well known to have been believed, and still to be believed, by some of the most respectable authorities in physic. Its

sible to give rise to the matter of tubercle, at least locally, by direct inoculation? I am acquainted with only one fact that bears on this point; and although I am aware that little stress can be laid on a single instance, I think it as well to notice it in this place. About twenty years since, while examining some vertebræ containing tubercles, I grazed slightly the fore-finger of the left hand by a stroke of the saw. The scratch was so small that I paid no attention to it; but on the following day it was slightly inflamed, and there gradually formed in it, and almost without pain, a small roundish tumour, apparently confined to the skin, and which at the end of eight days was of the size of a large cherry-stone. At this period, the epidermis cracked and showed us the small tumour within, which was yellowish, firm, and in every respect like a crude yellow tubercle. I cauterised it with the deliquescent hydro-chlorate of antimony, and felt no pain from its operation. At the end of a few minutes, however, after the fluid had penetrated the whole substance of the tumour, I detached it by a gentle pressure. The caustic had softened it and made it exactly like a soft friable tubercle. The walls of the cavity which had contained this body, were of a pearl-grey colour, slightly semi-transparent, and without any redness. I applied the caustic afresh to these. The part soon healed, and I have since found no further effects from the accident.[*]

If the question of contagion is very doubtful, the case is very different with the hereditary predisposition to tubercles. The universal and habitual experience of practitioners proves that the children of phthisical parents are more subject to this disease than others are. We happily, however, meet with numerous exceptions to this rule; as we not infrequently see families in which only one or two of its members become consumptive in each generation. On the other hand, we sometimes find large families of children destroyed by consumption, whose parents had never shown any signs of the disease. One family, in par-

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probability seems considerably increased by the results lately obtained in France from the insertion of pus into the veins of animals: and a remark made by M. Louis in his treatise on phthisis, may perhaps be considered as having some weight on the same side of the argument. He informs us (p. 46.) that, in phthisis, the ulcerations of the trachea are almost always situated on the *back* part of the tube, while those of the epiglottis are as constantly on its *lower* part;—points which the sputa rest longest upon or touch most frequently, in their passage outwards. This would seem to prove, at least, the irritating qualities of the sputa: but it is, no doubt, one thing to irritate and inflame, and another to produce a specific formation like that of tuberculous matter. However, in a practical question, of such high importance as the present, it is certainly the duty of every medical man to act cautiously, and not unnecessarily to expose the friends of his phthisical patients to a risk, which, although he may deem it problematical or even visionary, may not be so in reality.—*Transl.*

[*] Two French physicians, Hebreard and Lepelletier, have inoculated animals with the pus of scrophulous ulcers; and M. Lepelletier has repeated the experiment on himself; and Kortum and another, in Germany, have even ventured to inoculate children with the same. None of these experiments succeeded so far as even to produce local effects. (*Dict. de Méd.* t. xix. p. 194.)—(*M. L.*)

ticular, I myself knew, in which the father and mother died upwards of eighty years of age, and of acute diseases, after having seen fourteen children (born healthy and without any seeming predisposition to the disease) successively carried off by consumption, between the ages of fifteen and thirty-five. One other child of the same family, who was delicate from birth and with decided marks of tuberculous predisposition, is however still living, at the age of forty-eight, after having suffered several severe attacks of hæmoptysis, and appeared to be more than once affected with phthisis.* The ancients, and especially Aretæus, have carefully described this particular temperament or constitution. It is distinguished by the brilliant whiteness of the skin, the bright red of the cheeks, the narrowness of the chest, the projecting or winged configuration of the scapulæ, and the slenderness of the limbs and trunk, which is however combined with a certain degree of adipose and lymphatic stoutness. This particular constitution is attributed by Aretæus rather to hæmoptysical than consumptive subjects; and the remark is worthy of this accurate and clever observer, as there can be no doubt that phthisical subjects possessing this configuration, are more subject to hæmoptysis than others. It is however true, that individuals of this particular constitution, form the smaller number of consumptive patients; and that this terrible malady frequently cuts off those who are the most robust and have the best bodily configuration. The ancients thought that phthisis made its attacks particularly between the age of eighteen and thirty-five; (Hippoc. Ap. 9. sect. v.;) and it cannot be denied that this is the period at which it is most commonly manifest, and most easily recognised. Bayle, however, found, in the hospitals at Paris, that it was most common from the fortieth to the fiftieth year. But no age is exempt from it. The unborn fœtus has been found affected with it; and it is extremely common among the children of the common people, as is proved by the records of the Children's Hospital at Paris. It is likewise very frequent in old age; I once opened the body of a woman who died of this disease upwards of ninety-nine years of age.† Women are more subject to it than men.[*] Of all the occasional causes which can give rise to a considerable development of tubercles, the most powerful, the most evident and most frequent, is, unquestionably, the softening of a certain number of tubercles previously existing; since we know, as was formerly remarked, that it is at this period that the secondary eruptions of numerous tubercles take place in the lungs, and sometimes also in other organs.[†] In cases of this kind, at least, it is impossible not to admit the existence of an aberration of nutrition—an actual and peculiar change in the fluids, which gives rise to tubercles, and tubercles only. To admit with M. Broussais, that irritation or inflammation, which according to him are only degrees of the same affection, may produce, indifferently, tubercles, encephaloid cancer, melanosis, fibrous, bony, cartilaginous growths, &c., is to avow at once that inflammation itself is only an occasional cause. We must look for some other cause to account for the production of tubercles rather than the encephaloid cancer,—or for an eruption of tubercles affecting nearly all the organs of the body,

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* There can be no doubt of the frequently hereditary character of consumption. I mention the subject here merely with the view of enforcing the vast importance of keeping this in sight in the physical education of the children of consumptive parents. The *predisposition* to tubercles cannot be obviated in such cases; but no sufficient reason seems to exist, why we may not obviate, by proper management, their actual development, at least in a certain portion of cases.—*Transl.*

† The statistical researches concerning Paris published under the authority of M. Chabrol, tend to confirm the opinion of the ancients, as to the comparative frequency of phthisis in early and advanced life: the following are the decimal periods, in the order of the frequency of deaths from phthisis, at each particular age:—From twenty to thirty, thirty to forty, ten to twenty, forty to fifty, fifty to sixty; birth to ten, sixty to seventy, seventy to eighty, eighty to ninety, ninety to one hundred. It is proper to observe, however, that these tables refer to tubercles in the lungs only: had their occurrence in other organs been taken into account, the age from two to ten would,

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perhaps, have occupied the first, instead of the sixth place. It results from the researches of M. Lombard at the Childrens' Hospital in Paris, that of the children who die in their first and second year, tubercles are found in one-eighth; in two-sevenths of those who die from two to three; in four-sevenths of those who die from three to four; and in *three-fourths* of those who die from four to five. In the succeeding years up to puberty, tubercles are more frequent than before the fourth, but much less frequent than from the fourth to the fifth. M. Papavoine, of the same hospital, has recently published a statement which confirms the observations of M. Lombard, although with some slight differences. According to him, the total number of tuberculous children between the fourth and eleventh year, is greater than of those who are not tuberculous; tubercles being particularly prevalent from the fourth to the seventh year. Their frequency again increased about the twelfth and thirteenth year; and at fourteen and fifteen, the degree of prevalence is the same as at four and five. These results are obtained from researches made on nine hundred and twenty children (three hundred and eighty-eight boys and five hundred and thirty-two girls) between the ages of two and fifteen; and out of the whole number no less than five hundred and thirty-eight (somewhat less than three-fifths) were tuberculous. (*Journ. des Progrès*, t. ii. 1830; *Revue Méd.* Juin, 1830.)—(*M. L.*)

Dr. Young says, (Op. Cit. p. 45,) that "if we consult the evidence of actual registers of cases, we shall find that the disease is more frequent above thirty-five than below it." Of two hundred and twenty-three deaths from phthisis recorded by Bayle and Louis, twenty-one occurred between the age of fifteen and twenty; sixty-two from twenty to thirty; fifty-six from thirty to forty; forty-four from forty to fifty; twenty-seven from fifty to sixty; thirteen from sixty to seventy.—*Transl.*

[*] This opinion is corroborated by many writers. A statement given by M. Louis (Op. Cit. p. 522,) affords a strong argument in its favour: out of one hundred and sixty-three subjects in whose lungs tubercles were found after death, ninety-three were women and sixty-eight men. The statistical tables of Paris, out of nine thousand five hundred and forty-two cases of phthisis give five thousand five hundred and eighty-two women, and, consequently, only three thousand nine hundred and sixty men. Several obvious causes explain the greater liability of females to phthisis. The chief of these are—their greater original delicacy of constitution—their most deleterious system of physical education from the age of ten to puberty,—the wearing of stays,—and the exposure of the upper parts of the chest.—*Transl.*

[†] In making this statement, I think our author is justly chargeable with the application of the axiom so much reprobated by himself—*post hoc, ergo propter hoc.* Why should not the original causes of the first crop of tubercles be still in operation!—*Transl.*

rather than the development of a cartilaginous substance confined to the part first affected, and converting the tuberculous ulcer into a fistula with hardly any evil consequence to the general health.*

SECT. V.—*Physical signs of tubercles.*

With the exception of some very rare cases, tubercles first make their appearance in the summit of the lungs. It is in this place, therefore, that we must seek them. The earliest signs usually show themselves below the clavicle. Small tubercles, separated from one another by portions of healthy lung cannot be recognized. But at this period of their progress, the health is commonly still good, and the cough too slight to induce the patient to consult a medical man.

Signs of the accumulation of crude or miliary tubercles.—When miliary tubercles are accumulated in great numbers in the upper portion of the lungs, the sound resulting from percussion of the clavicles becomes less, and is usually unequal. The right lung being in general the earliest and most severely affected, the defect of resonance is almost always on the right side. This deficiency of sound extends sometimes over the upper and fore parts of the chest as low as the fourth rib.‡ These, indeed, are the only parts of the chest where the mere accumulation of tubercles can give rise to this phenomenon; if we except the interscapular region, in which we sometimes find a deficiency of sound, owing to the great accumulation of tubercles at the roots of the lungs and in the bronchial glands. When the sign just mentioned exists, and even where it is wanting, a diffused bronchophony, more or less marked, is perceived beneath the clavicle, over the infraspinal fossa of the scapula, and in the axilla. We must, however, disregard this last sign, if it is perceived only about the inner and upper angle of the scapula, on account of the vicinity of the bronchi.

Signs of the softening of tubercles.—When the tubercles begin to soften, the same signs continue; and in addition to these, the cough gives rise to a kind of guggling, as if the matter that produced it were thick, and agitated *en masse*. The guggling, however, soon becomes more liquid and more like the mucous rhonchus; and the cough, transformed to *cavernous*, indicates the formation of a pulmonary excavation. In proportion as this empties itself, the respiration also assumes the cavernous character, and, together with the cough, points out the increasing extent of the cavity. The diffused bronchophony then gives way to pectoriloquy, which is at first imperfect, and frequently interrupted, but gradually becomes more distinct. Sometimes, in proportion as the excavation empties itself, the resonance of the chest, which had been obscure, becomes clearer; and I have known physicians deceived by this circumstance, so as to imagine that their patient was improving. Most frequently, however, even after the formation of a considerable excavation, the sound does not become louder, because there is developed at the same time around it, a great number of crude tubercles. It is also at this time, when the tuberculous matter begins to soften, that we sometimes perceive on percussion, a guggling, or a jar, like that yielded by a cracked pot, and accompanied by the resonance indicative of the presence of a cavity. This sign always points out that the excavation is very near the surface of the lung; and is never observed except in lean subjects, the walls of whose chest are thin, and the ribs more than usually moveable. When a superficial excavation has some of its walls thin, soft, and not adhering to the costal pleura, the phenomenon which I have termed the auricular *puff*, *simple*, or *veiled*, frequently accompanies the cavernous respiration and cough, as well as the pectoriloquy. In this case, every word is followed by a puff like that used in blowing out a candle, and which would be mistaken for a puff in reality, if the sense of touch did not rectify that of hearing. By making the patient speak in monosyllables, we ascertain that the puff immediately succeeds, rather than accompanies, the voice.

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* Among many other occasional causes usually enumerated by authors, and unnoticed by M. Laennec, *the inhalation of dust*, by various classes of artisans and others, deserves notice; although I am of opinion that bronchitis and not phthisis is the disease commonly produced by causes of this kind. The same remark is applicable, I conceive, to the great majority of the cases of consumption complicated with gastric disorder, and termed *dyspeptic phthisis* by Dr. Philip.—*Transl.*

‡ In no case is the importance of *percussion* so frequently and strikingly evinced as in the earlier stages of phthisis. A single blow on the clavicle will often afford the means of a more certain diagnosis and prognosis, than weeks or even months of observation of the general symptoms. How often have I heard in this ominous sound the death-knell of my patients!—*Transl.*

Signs of the complete discharge of the tuberculous matter.—When a tuberculous excavation is completely empty, this state is clearly indicated by the cavernous respiration and cough. In most cases the cavernous rhonchus is no longer heard; and if it sometimes takes place, owing to a secretion going on from the walls of the cavity, it is only temporarily, and frequently disappears for several hours, after the patient has expectorated. At this period, and often long before this, pectoriloquy becomes quite perfect. I have in a former part of this volume described pectoriloquy, the most important of those signs which point out a pulmonary excavation. On account of its great value, however, I think it proper to enlarge a little more on it, in this place. I formerly stated that pectoriloquy may be *perfect*, *imperfect*, or *doubtful*, that it may be suspended for some time, and in certain cases even disappear almost entirely. When pectoriloquy is doubtful, and exists only in the interscapular region, below the axilla, or towards the junction of the clavicle and sternum, we must lay no stress on it. Indeed, we may extend the same restriction to the whole of the upper parts of the chest as low as the upper rib, when the phenomenon is very doubtful, and as perceptible on one side as the other. This restriction is founded on the circumstance of there being more bronchial tubes of a certain diameter in the top of the lungs than elsewhere. These are sometimes very superficial; and when this is the case they frequently give rise to the phenomenon in question; which is, in point of fact, only bronchophony. When we explore the space between the clavicle and upper edge of the trapezius muscle, we must be very careful to keep the stethoscope perpendicular; because if we give it the slightest direction towards the neck, we hear the natural resonance of the voice in the larynx and trachea, and will be very apt to confound this with pectoriloquy, if not much accustomed to the practice of auscultation. But when this doubtful pectoriloquy is observed below the third or fourth rib, or on one side only, it affords at least a strong presumption of the existence of an excavation; and if, at the same time, it does not exist in the points above mentioned, the presumption may be considered as amounting to certainty: we have only to think that the cavity is situated deep within the pulmonary substance, or that it is still, in a great measure, filled with tuberculous matter imperfectly softened. In whatever part of the chest it may be, when the resonance of the voice is much stronger than on the opposite side, and particularly if it is so intense as to seem louder and nearer the ear of the observer, than the natural voice heard without the stethoscope, we may consider the sign quite as certain as if the voice traversed the tube of the instrument: and in such case we say the pectoriloquy is *imperfect* and not doubtful. Between the most *perfect* pectoriloquy and that which is completely *doubtful*, there are many degrees which can only be learned by habit, and which it would be as difficult as it would be superfluous to describe. In one degree, for example, the voice seems to enter a short way into the extremity of the tube, but does not traverse it completely. Pectoriloquy is more distinct according as the voice of the individual is more sharp; and as women and children are the subjects in which this character is most strikingly marked, we must be particularly on our guard, in them, not to confound with pectoriloquy the doubtful bronchophony which exists naturally in some points of the chest. In men, on the other hand, who have a very deep voice, pectoriloquy is frequently imperfect, and sometimes doubtful, even when there exist in the lungs excavations of the sort best calculated for producing it. The deeper the voice is, the resonance within the chest is found to be the stronger; and in cases of this kind, the natural vibration of the walls of the thorax is sometimes so great as to mask the pectoriloquy. In such persons, the voice, tremulous and agitated, seems unable to penetrate the tube, but resounds at its extremity twice or thrice as loud as when heard by the naked ear. The patient seems as if he spoke through a speaking trumpet, quite close to us, and not through a tube into our ear. This particular phenomenon is as characteristic of the lesion in question as pectoriloquy, and quite sufficient for practical conclusions, especially if it exists on one side only. It becomes more striking, as formerly observed, if we shut the other ear: and, indeed, the difference of the resonance of the voice in the diseased and sound portions of the lungs, is then so great, as to render the certainty of an excavation quite as complete as if it were announced by the most perfect pectoriloquy. It is only when slight and equally distinct on both sides of the chest, that we can entertain any doubts of its import. The most evident pectoriloquy may present very striking differences: in some, the voice passes uninterruptedly through the cylinder; in others, it is intermittent, and heard only by fits, some of the sharper tones merely reaching the ear occasionally. This intermission occurs when the excavations open into bronchi of a small size, or when the openings continue to be partially obstructed by the sputa: whether interrupted or continuous, however, the phenomenon is equally characteristic. Even in cases of perfect and continuous pectoriloquy, the sound is sometimes interrupted by a similar cause; as we frequently find it wanting in patients who had exhibited it in the most striking manner only a few hours, or even minutes previously. In cases of this kind, the existence of the *cavernous rhonchus* in the point where pectoriloquy had been observed, leaves no doubt as to the cause of the cessation of the latter. For this reason, we must never pronounce a phthisical patient to be non-pectoriloquous, until after we have examined him several times, at different hours of the day, and particularly just after he has been expectorating. It frequently happens in these cases of suspension, that coughing will restore the pectoriloquy instantly. This phenomenon presents still other varieties in relation to the character of the voice itself: the articulation of the words may be more or less distinct; the sound of the voice may be more or less changed. In most cases, the voice is a little sharper than when heard in the natural manner, and is moreover somewhat smothered, like that of ventriloquists. As with these mimics also, the articulation of certain words is very distinct, while that of others is very obscure. Sometimes the voice is feebler than the natural voice of the patient; but usually it is stronger. I have frequently observed, while examining patients in whom pectoriloquy existed in the back, and whose voice was very weak, that I could distinctly hear their replies, through the cylnder; whilst, at the same distance, I could only hear, without it, some broken words. Finally, in cases of indi-

more evident, the thinner the walls of the excavation ar
the difference of a few lines in this respect, is of no great
quence. I have found it very distinct where the excavati
situated more than an inch beneath the surface, and surro
by a portion of lung very healthy and quite permeable
air;—a condition of parts which would seem very little f
able to the propagation of sound. The excavations, which
a middling size, and with few anfractuosities, afford the mo
fect pectoriloquy; but those which are very small, freq
yield it in a very unequivocal manner. In one case, I fo
very evident at the junction of the third rib with the st
and in no other part of the chest. On examining the body
death, the lungs were found full of tubercles which, with o
ception, were not yet completely softened: a single excavati
the size and shape of a prune-stone, existed in the inner e
the lung, and corresponded exactly with the point of the
where the pectoriloquy had been perceived. The excava
which are much larger in one direction than in another
are flattened by the falling together of their sides, are the
proper for affording pectoriloquy, and sometimes do not af
at all. This is particularly the case, when an excavation o
kind exists very near the surface of the lungs, and whe
pleura, which almost of itself forms its outer boundary, do
adhere in this point to the ribs. In examples of this kind
obvious that the thin outer wall of the cavity must fall in,
the patient is speaking, (as speech takes place only durin
piration,) and consequently, that pectoriloquy cannot be
duced. When there is a great number of excavations co
nicating with one another, and producing a multitude of a
tuosities, the patient's voice is still found to traverse the cyli
but the articulation of the words is somewhat smothere
confused. This is almost always the case when the pheno

distinctly and articulately, without any rhonchus or foreign sound being perceived in the same point, we must conclude that the cavity is quite empty, and its communications with the bronchi large and short. When, on the contrary, the sound is accompanied with a sort of guggling, which renders the articulation of words less distinct, we are to infer that the cavity contains a certain quantity of tuberculous matter of the consistence of pus.

No one of the stethoscopic results has been more generally verified, as well in France as in other parts of Europe, than the uniform co-existence of pectoriloquy with ulcerous excavations in the lungs. I shall not, therefore, enlarge further on this point. I must, however, make one remark in this place, which may be important to such of my readers as are not much accustomed to dissections themselves, or who employ for this purpose inexperienced assistants: in the hurry of examination it is quite possible that no excavation may be found, although one really exists. This circumstance is of more likely occurrence when the lung adheres firmly to the walls of the chest, and the excavation happens to be very superficial. In cases of this kind, as the lung can only be detached by forcible detraction, or by the scalpel, it may happen that either the whole or the greater part of the excavation may be left attached to the side of the chest. A circumstance of this kind occurred in an early stage of my researches; and if M. Recamier, who assisted at the examination, (which was hastily performed,) had not fortunately preserved the portion of the detached lung, it would not have been ascertained that an excavation did exist in the point of lung over which pectoriloquy had been perceived.

I formerly stated that pectoriloquy sometimes disappears entirely, or exists only very rarely and feebly, in excavations which are extremely large, although regularly shaped. But in cases of this kind, this phenomenon is replaced by two others equally certain in their indications; I mean the *cavernous respiration* and *metallic tinkling.* The first of these signs more particularly, is of frequent occurrence.* Metallic tinkling can only occur when the excavation is large, communicating with the bronchi, and containing only a very small quantity of fluid. If there is

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* Our author seems to have taken less notice of the state of respiration in the *first stage*, than it appears to deserve. In many cases, no doubt, as is particularly remarked by Andral, it is perfectly natural, even when there is a numerous crop of tubercles in the lungs; and even sometimes when these have reached the state of excavation. In many cases, as is also noticed by the same author, the respiration is puerile, or louder than natural, in different parts of the chest, which is probably owing to the formation of many tubercles at the same time in lungs otherwise healthy. This kind of respiration in adults ought always to excite suspicion. In a large proportion of instances, however, the respiration is less than natural under one or both clavicles; and if this is the case under *one* clavicle only, it is a valuable sign. In these cases, we also frequently observe in the same points, together with a weak respiration and diminished sound on percussion, different kinds of rhonchus,—mucous, crepitous, or sonorous.—*Transl.*

to the nature of the case. (*Archives de Méd.* 1824.) I
doubt extremely probable that such a pain must almost
take place, since the first effect of the perforation is imme
to produce pleurisy and pneumo-thorax; but the patient
likely to confound this pain with his habitual sufferings,
physician is very likely to overlook it for the same reas
shall conclude the section with two cases of very large t
lous excavations indicated by the metallic tinkling.

Case XXVII. *Tuberculous cavity partly convert*
fistula, producing metallic tinkling.—A woman, fifty y
age, who had been affected with cough and expectoration
veral years, and which had got much worse within a few
past, came to the Necker Hospital on the 13th April,
having, for the first time, been obliged to desist from he
nary occupation. She looked much older than she wa
was very thin. The pulse was quick, skin slightly hot,
expectoration, which was in moderate quantity, consisted o
yellow sputa intermixed with much transparent ropy
The stethoscope, applied to the anterior and upper part
right side, and to the right axilla, detected distinct pectori
and in the same places, when the patient coughed or spok
still more during respiration, there was heard a tinkling, li
of a small bell which has just stopped ringing, or of a gn
zing within a porcelain vase. A mucous rhonchus or

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[*] For an interesting account of *perforation of the lungs*, including the
seven cases, I refer the reader to M. Louis's Treatise on Phthisis, Chap. vi
This accident is much more common than is usually imagined: indeed, it
rarely taken notice of in this country. It is, however, highly deserving t
tion of physicians, in relation both to the prognosis and treatment. In M
cases, the rupture of the tuberculous excavation was indicated

distinctly and articulately, without any rhonchus or foreign sound being perceived in the same point, we must conclude that the cavity is quite empty, and its communications with the bronchi large and short. When, on the contrary, the sound is accompanied with a sort of guggling, which renders the articulation of words less distinct, we are to infer that the cavity contains a certain quantity of tuberculous matter of the consistence of pus.

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On puncturing the left side of the chest there was an es gas, which must have come from the cavity of the pleura. was no effusion in this side of the chest, and the greater the lung was unattached, except at its very upper point. was strongly attached to the costal pleura by a very whitish, fibrous membrane, covering a sort of cartilaginou trice in the lung, of two or three lines in thickness, whi mounted an irregular cavity of the size of a pigeon's egg. walls of this were formed by a condensed pulmonary sub and inclosed a small calcareous concretion. The remaining of this lung were pretty sound, only containing some tube

Case XXVIII. *Tuberculous excavation producing th tallic tinkling.*—A woman, aged forty, came into the Hospital 29th January, 1818, having been affected with for five months, and which had increased since her confin three months before. At this time the respiration was sho quick, and difficult; the chest sounded pretty well on th and left side before,—but better on the right side; the distinct pectoriloquy near the junction of the sternum a clavicle, and the same phenomenon, but less distinct, on th side where the arm joined the chest; the sound of the ve was dull, and the heart gave hardly any impulse. Two after, by means of the cylinder, we distinguished a sound bling fluctuation, in the left side, when the patient coughe the *metallic tinkling* when she spoke. Succussion of the did not produce the sound of fluctuation. From these the following diagnostic was given: *Very large tuberculo cavation in the middle of the left lung, containing a small tity of very liquid matter.* The patient died five days aft guggling existed in the same points; and all these phenomena were distinctly perceptible over the whole space from the top of the shoulder to the fourth rib,—being only more distinct anteriorly, and under the axilla, than behind. The respiration was sufficiently distinct over the greater part of the chest, except at the roots of the right lung, and the top of the left, where it was scarcely perceptible. The Hippocratic succussion afforded no result. From these various signs I made the following diagnosis: *Vast tuberculous cavity occupying the whole of the superior lobe of the right lung, and containing a small quantity of fluid: tubercles, especially at the top of the left and root of the right lung.* Four days after her entry this woman was discharged for irregularity. She came into the hospital again in the end of May, affected with precisely the same symptoms. She died suddenly on the 6th of June.

Dissection twenty-four hours after death.—On penetrating with the scalpel between the fourth and fifth ribs of the right side a small quantity of air escaped.* The lungs on this side were flattened from within outwards towards the ribs, and adhered throughout to the pleura of the ribs, mediastinum and diaphragm. Above the sixth rib the adhesion was very close. The upper half of this lung was occupied by a vast tuberculous cavity, which contained about two spoonfuls of a purulent fluid. The parietes of this excavation (except on the lower side) consisted of condensed pulmonary tissue, surrounded by a thin layer of a fibrous texture like the lateral ligaments of the joints, which was intimately connected with the pleura of the ribs and lungs. The main cavity was large enough to contain the hand of the largest man, and branched out into many anfractuosities: it was crossed at one point by a band of flaccid pulmonary tissue, pretty healthy, and covered by the lining membrane of the excavation. Here and there blood-vessels of the size of a crow-quill ramified on the interior of this, some adherent, and others partially detached, some quite obliterated, others only partially. A semi-cartilaginous membrane, extremely uneven and of very variable thickness, lined the cavity throughout; and this was the only boundary, on the inferior part, between it and a branch of the pulmonary artery large enough to admit the little finger. The anterior part of this excavation terminated in a longish cul-de-sac, which was lined by a membrane entirely cartilaginous, and much thicker than that of the other parts of it. In cutting this part of the lung from above downwards, we could trace this cartilaginous lining under the form of a lamina of cartilage for more than an inch into the substance of the lung beyond the walls of the excavation. This was no doubt the remaining cicatrice of a cavity which had communicated with that which existed at present. Some bronchial tubes that stretched towards this lamina terminated in culs-de-sac before reaching it, still, however, retaining a considerable calibre, and having their mucous membrane very red and thickened. Several other branches of the bronchi opened into the existing cavity, with their terminations quite smooth and polished. The anterior portion of the superior and middle lobes, which had not been implicated in this destruction, was still crepitous, and contained, in different parts, small groups of tubercles in different stages, as did also the lower lobe.

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* This must have come from the excavation which will be immediately noticed, as the cavity of the pleura was obliterated.—*Author.*

On puncturing the left side of the chest there was an escape of gas, which must have come from the cavity of the pleura. There was no effusion in this side of the chest, and the greater part of the lung was unattached, except at its very upper point. This was strongly attached to the costal pleura by a very thick, whitish, fibrous membrane, covering a sort of cartilaginous cicatrice in the lung, of two or three lines in thickness, which surmounted an irregular cavity of the size of a pigeon's egg. The walls of this were formed by a condensed pulmonary substance, and inclosed a small calcareous concretion. The remaining parts of this lung were pretty sound, only containing some tubercles.

CASE XXVIII. *Tuberculous excavation producing the metallic tinkling.*—A woman, aged forty, came into the Necker Hospital 29th January, 1818, having been affected with cough for five months, and which had increased since her confinement three months before. At this time the respiration was short and quick, and difficult; the chest sounded pretty well on the back and left side before,—but better on the right side; there was distinct pectoriloquy near the junction of the sternum and left clavicle, and the same phenomenon, but less distinct, on the same side where the arm joined the chest; the sound of the ventricles was dull, and the heart gave hardly any impulse. Two days after, by means of the cylinder, we distinguished a sound resembling fluctuation, in the left side, when the patient coughed, and the *metallic tinkling* when she spoke. Succussion of the trunk did not produce the sound of fluctuation. From these results the following diagnostic was given: *Very large tuberculous excavation in the middle of the left lung, containing a small quantity of very liquid matter.* The patient died five days after this.

Dissection twenty-four hours after death.—In the right lung through its whole extent, there were innumerable tubercles of a yellowish white colour, and varying in size from that of a hempseed to a cherry-stone, and even a large filbert. These last were evidently formed by the reunion of several smaller ones, and, for the most part, were more or less softened. Besides these, there were, in other parts, several cavities, the largest of which would have contained a hazel nut, completely filled by pus, thicker than that of an abscess, and lined by a double membrane, the inner layer of which was white, soft, and little adherent to the other; the outer was of a cartilaginous character and semi-transparent, and incomplete in certain points. The left lung adhered closely to the pleura of the ribs and pericardium. On its anterior and lateral part it contained, near its surface, three cavities, one above the other, and communicating by two large openings. The upper, of the size of a pigeon's egg, occupied the top of the lung, and corresponded to the junction of the clavicle and sternum; the second might have contained a pullet's egg, and the lowest, which reached within an inch of the base of the lung, was of the size of a walnut. These excavations were lined by two membranes, like those in the right lung, containing a liquid pus, and communicated with several bronchial tubes. This lung contained also some smaller cavities and tubercles, and exhibited marks of inflammation in various places.*

SECT. VI.—*Symptoms and progress of phthisis.*

Although characterized in its latter stages by very marked symptoms, phthisis pulmonalis is extremely variable in its onset, and in many cases it is difficult to recognize it from its symptoms only, in any part of its course. With a view to its more correct discrimination, I shall consider it under five different forms or varieties.

1. *Regular manifest phthisis,—phthisis of the ancients.*—Distinct or manifest phthisis frequently begins with a slight dry cough, which might be readily mistaken for the effect of a dry catarrh. It was no doubt the observation of this seeming catarrh preceding the disease, that led the ancients to attribute consumption to it. And this opinion must have appeared probable, before the progress of pathological anatomy had discovered the existence of miliary tubercles in the lungs previous to every local or general symptom of the disease. This kind of cough may

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* I think it highly necessary, in this place, to caution the student against yielding too implicit confidence to auscultation and percussion, as means of diagnosis, to the neglect or exclusion of the more usual methods. It is no doubt true, that these measures are of the very first importance in the diagnosis of this, as of almost every other disease of the chest; that in many cases they alone suffice to fix the diagnosis; and that in others this cannot be established without them: at the same time, it is equally certain, that if we attempt, as our general practice, to draw our conclusions, from these *signs* alone, without reference to the local and general *symptoms*, we shall frequently not merely fail to attain our object at all, but we shall run great risk of falling into errors of the most serious nature. It is only by combining the practice of auscultation with the faithful observation of symptoms, and by studying the results obtained from both sources, with a reference to the pathology of the disease, that we can hope to attain such a certainty of diagnosis as can satisfy a philosophical mind. I dwell the more upon this point, on the present occasion, as pectoriloquy is one of the results of auscultation most likely to impress strongly the mind of the student, and because I am of opinion that our author lays more stress on it than it deserves. Though very valuable, I confess that it is far from being, in my estimation, the most valuable of the stethoscopic signs.—*Transl.*

which we are, at the time, far from considering tubercles
cause. Pretty frequently an hæmoptysis, more or less se
the first sign of the disease. This sign, however, is ne
tain; and in this stage of the complaint, the hæmorrhag
return repeatedly, after an interval of weeks or months,
affording any positive proof of the existence of tubercles.

In whatever way the disease commences, a more or less
dant mucous expectoration and a constant state of fever
gradually supervene. This fever has commonly two ac
the one about noon, and the other about the beginning or
of the night. Sometimes it is attended at the beginni
chills, which return with the tertian, double tertian, or qu
type; and it is by no means very unusual to find phthi
veloping itself during the course of an intermittent fever.
wards morning, perspirations come on: and these are som
so enormous as to wet two or three mattresses in the cours
single night. However intense this hectic fever may be,
judging from the frequency of the pulse and heat of the s
is sometimes very great,) it is hardly ever accompanied by
of the severer symptoms which we frequently observe in
thic fevers, having the two symptoms just mentioned in a
less degree. In the symptomatic fever of consumption, th
is free; the respiration is sometimes scarcely shorter th
health; the digestive functions are frequently in a state o
fect integrity; and even the muscular strength does not f
a long time,—and when it does give way, it appears to be
rather to the excessive evacuations, than to the severity
fever. To the colliquative sweats, a diarrhœa no less de
ting supervenes, and rapidly wastes the patient's strength
females the catamenia are almost always suppressed shortly

consumption to the suppression; although the fact is, that this, in the majority of cases, is only the effect of the development of tubercles in the lungs.* As soon as the hectic fever is established, wasting of the body becomes manifest, and makes more rapid progress, according as the perspiration, the expectoration and the diarrhœa are more abundant. In women and persons of a lymphatic habit, the skin becomes white or blueish-pale, with a very slight shade of lemon-yellow. The emaciation then makes rapid progress towards complete marasmus; and presents to us the picture traced with such frightful truth by Aretæus. The nose becomes sharp and drawn; the cheeks are prominent and red,—and appear redder by contrast with the surrounding paleness; the conjunctiva of the eyes is of a shining white or with a shade of pearl-blue; the cheeks are hollow; the lips are retracted, and seem moulded into a bitter smile; the neck is oblique, and impeded in its movements; the shoulder-blades are projecting and winged; the ribs become prominent, and the intercostal spaces sink in, particularly on the upper and fore parts of the chest. Sometimes even the whole chest seems contracted, as was observed by Bayle; and this may actually be the case, particularly when the disease is very chronic, owing to the contraction and tendency to cicatrization of large tuberculous excavations. The belly is flat and retracted; the larger joints and those of the fingers, appear enlarged from the falling away of the neighbouring soft parts; and even the nails become incurvated, in consequence of the absorption of the pulpy extremities of the fingers. No other disease gives rise to so complete emaciation as phthisis,—except cancer and continued fever of long duration.

But neither this degree of emaciation nor the other symptoms just enumerated, are in all cases proofs of an incurable disease. I have already noticed (CASES XXV. and XXVI.) two instances of cure after the patients had been reduced to the most extreme degree of emaciation. But death may take place long before the disease has produced this degree of wasting. After the supervention of the hectic fever and expectoration, the course of the disease varies in general very little: its uniform progress towards a fatal termination being only hastened by the occasional increase of the perspirations or diarrhœa. In this stage of the disease, hæmoptysis, to any extent is very uncommon. Now and then there only appear a few streaks of blood in the expectoration; and indeed the greater number of patients, and even those who had severe hæmorrhage at the beginning, exhibit no traces of it whatever. Pretty often, at the period when the complete evacuation of a tuberculous cavity is indicated by the stethoscopic signs, the patient experiences a marked improvement in his symptoms;—the expectoration and fever decrease, and if the

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* See Morton's *Phthisiologia*, Lib. ii. Cap. ix. "De Phthisi a chlorosi et suppressione menstruarum purgationum orta."—*Transl.*

shall find that there is hardly one of them that does not
some signs of amendment at the period when the ca
rhonchus and respiration indicate the complete or near
plete destruction of the primary tuberculous masses; a
the return of the general symptoms in their primitive in
is more or less rapid, according as the tubercles of the se
eruptions are more or less advanced in their progress. W
likewise observe that the cases, in which convalescence b
apparently confirmed and lasts several months, are th
which the secondary eruptions do not take place until a
complete softening of the first crop of tubercles. I am con
by experience, that in the greater number of cases, erup
this kind take place at an earlier period, and especially
time when the primary tubercles begin to soften. The c
complete cure are evidently those in which the secondar
tion does not take place at all.

The stethoscopic signs afford the only certain means by
we can recognize the softening of the tuberculous matter
discharge into the bronchi. We seldom derive any ass
from the local symptoms, in this respect. Sometimes o
observe a few streaks of blood in the expectoration, at th
when the matter makes its way into the bronchi, and it
tremely rare to find distinct portions of tuberculous matte
expectoration.—In general nothing is more uncertain th
local pains in this disease: most of the patients have som
many have none at all; and some have very acute pain,
sioned either by the supervention, from time to time, of
pleurisies or peripneumonies, or by simple neuralgia, un
panied by any mark of inflammation. In some cases, the p
are sensible of the guggling of the softened tuberculous
and can point out the spot whence their expectoration
This, however, is very unusual; and we, on the other hand

Notwithstanding the efforts which have been made, in all ages, to deduce pathognomonic signs from the appearance of the expectoration in phthisis, it must be confessed that this affords no peculiar characters which are not met with in the sputa of chronic catarrh. And modern chemistry has thrown no new light on the subject. Three different kinds of matter may enter into the composition of the sputa of consumptive subjects, viz. catarrhal mucus,—the matter of tubercles more or less softened,—and (sometimes) the pus secreted by tuberculous excavations which are completely empty. Neither chemical analysis nor the physical characters of these matters, enable us certainly to discriminate them from each other. In general, no doubt, pus is more opaque, more intimately blended, and more fetid than catarrhal mucus; yet nothing is more common than to observe in simple chronic catarrhs, sputa of a character entirely puriform. It is extremely rare to meet with well-marked tuberculous matter in the expectoration. When this is completely softened, it combines so intimately with the puriform mucus secreted by the bronchi, that it is impossible to distinguish the one from the other. Besides, tuberculous matter can only form a very small proportion of the expectoration when this is at all considerable. If it amounts to more than a pound daily, considering how slowly the excavations empty themselves, we cannot believe that the tuberculous matter can amount to more than twelve grains—that is, to a thousandth part of the whole. Sometimes, indeed, but very rarely, we observe in the expectoration, small fragments of softened tuberculous matter, very distinct. In one case already recorded, I witnessed the expectoration of a pretty large fragment of tuberculous matter with a portion of lung attached to it. But we may be very easily deceived in respect to this kind of expectoration. The mucous follicles of the tonsils frequently secrete a fatty matter, of a slightly yellowish white colour, half-concrete and friable, and extremely like tuberculous matter in appearance. It differs from this, however, in two striking characters: it emits a fetid odour when squeezed, and it greases paper when heated on it. This kind of secretion is often very great in persons in good health. I was once deceived myself by a case of this kind. A patient came into the hospital in a state of ex-

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owing considerations:—1. tubercles exist in other parts, as the glands, without pain; 2. the pain in cases of phthisis resembles that of pleurisy, in being affected by respiration, &c. &c.; 3. in some cases where large excavations existed on one side with little or no adhesions, and numerous adhesions on the other with few or no excavations, the pain had been principally in the latter side; 4. in the cases (twenty-two in number) in which no pain had existed, adhesions were found only at the summit of the lungs, a situation in which pleuritic pains would be naturally less, owing to the comparative immobility of that part of the chest. M. Louis, however, admits, that in some cases pain had existed when no trace of pleurisy could be detected after death. *Recherches*, p. 205.—*Transl.*

treme emaciation, and with considerable expectoration. On examining his spitting-pot, I observed the muco-puriform sputa intermixed with numerous fragments of a matter resembling that of tubercles, and some larger than cherry-stones. I looked upon the patient as phthisical; but he died on the following night, before I had an opportunity of exploring the chest, and of a disease quite unconnected with this cavity. Upon examining the body, the lungs were found quite sound, and the follicles of the tonsils filled and dilated with a fatty matter similar to that expectorated by the individual. Generally speaking, then, the expectoration in phthisis is similar to that of chronic catarrh—being mucous, opaque, little soluble in water, containing a few air-bubbles, of a pale-yellow, or yellowish-white, and sometimes of a slightly greenish or ash colour. These characters vary somewhat with the period of the disease. In the beginning, the yellow and formed sputa are intermixed, as in many cases of acute catarrh, with a colourless and diffluent watery phlegm, with which they do not combine on account of their comparative insolubility. Later in the disease, the watery or pituitous expectoration ceases, and the *concocted* or formed sputa unite in one mass. Towards the close of the disease, the expectoration becomes usually less and less copious, and assumes an ash or dirty green colour. At this time, its diminished cohesion, its complete opacity, and its greater solubility in water, lead to the opinion that it contains a certain proportion of black pulmonary matter and pus, secreted by the walls of excavations nearly empty. In every stage of the disease, we sometimes observe in the expectoration, cylindrical and vermicular portions which appear moulded in the smaller bronchi. To conclude,—we cannot yield much confidence to the inspection of the sputa in this disease, inasmuch as those which are most characteristic,—viz. the ash-coloured puriform and vermicular,—are frequently met with in chronic catarrh; and because it appears, from what was formerly stated, that, with the exception of about a thousandth part, the whole of the expectoration is the product of the pulmonary catarrh, with which the tuberculous affection is almost always complicated. The progress of this catarrh is very various. Sometimes the yellow mucous expectoration commences with the first obvious symptoms of the disease; sometimes it succeeds these; most commonly it appears to begin at the period of the softening of the first crop of tubercles; and, lastly, in some rare cases, it shows itself only when the tuberculous matter first makes its way into the bronchi. It is, indeed, to the re-union of these two circumstances, viz. the evacuation of a large tuberculous excavation and the simultaneous development of a very extensive and very loose catarrh, that we must attribute the greater number of those cases known to practitioners by the name of *vomica*,—respecting which I shall here make a few remarks, premising merely that it is much less frequent than it is supposed to be.*

Vomica of the lungs.—By this term is commonly understood a sudden and copious expectoration of puriform matter, coming on after symptoms of incipient phthisis. In cases of this kind, after an expectoration so abundant as almost to suffice to fill one of the sides of the chest in twenty-four hours, we sometimes find the cough and expectoration gradually lessen after a few days, and see the patient restored to a state of perfect and permanent health. More commonly, however, after a temporary amelioration, the disease resumes its march, becomes even more distinct than before, and soon puts an end to the patient's life. Cases of the kind just mentioned, had early engaged the attention of physicians. Hippocrates has treated largely of them in several parts of his writings. He considered vomicæ as true abscesses of the lungs, and denominated the patients in whom they occurred, *empyical* or *suppurated* (ἐμπυοι). This name indeed he applies to all those who have an abscess, in whatever part of the body it may be; but in modern times the term has been restricted to collections of matter in the pleura. Vomicæ of the lungs were considered by Hippocrates as differing from phthisis. He says they may open either into the bronchi or the cavity of the pleura. The former of these terminations appeared to him fortunate, and he sometimes even endeavoured to produce it artificially, by forcibly shaking the patient's trunk.[*] The latter was reckoned the usual cause of the pleuritic empyema.

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* I do not think that our author has done sufficient justice to the expectoration, as a sign of the presence of tubercles in the lungs; more especially in the latter stages of the disease. It is no doubt true, that every one of the characters of phthisical sputa may be sometimes met with in those of chronic catarrh or bronchitis; but I believe this to be by no means a common case: and I think that we hardly ever meet with an instance of the latter disease in which the expectoration undergoes the *progressive changes* so frequently observed in phthisis. For the fullest and most accurate account we possess of the expectoration in this disease, I refer the reader to Andral's work, tom. iii. p. 118; and for a correct but briefer detail, to that of Louis, p. 187. The expectoration in phthisis has engaged the attention of medical writers more than that of any other disease of the lungs; and many valuable observations respecting it are to be found in the writings of the ancients, particularly Hippocrates and Aretæus: and also in the works of the early moderns, among which those of our countrymen, Bennet and Morton, deserve particular notice. (*Theatrum Tabidorum.—Phthisiologia.*) It may be of some use to the student, if I state here, in a few words, what appear to me the most usual characters and progressive changes of the expectoration in phthisis.—In the earliest stage of the disease, the cough is either quite dry, or attended by a more watery or slightly viscid, frothy, and colourless fluid; this on the approach of the second stage gradually changes into an opaque, greenish, thicker fluid, intermixed with small lines or fine streaks of a yellow colour. At this period, also, the sputa are sometimes intermixed with small specks of a dead white or slightly yellow colour, varying from the size of a pin's head to that of a grain of rice, and which have been compared by Bayle to this grain when boiled. These have been noticed by many writers from Hippocrates downwards. After the complete evacuation of the tubercles, the expectoration puts on various forms of purulency; but frequently assumes one particular character, which has always appeared to me pathognomonic of phthisis, although the more accurate and extensive observation of modern pathologists, has proved the same to exist occasionally in simple catarrh. The expectoration to which I allude, consists of a series of globular masses, of a whitish-yellow colour, with a rugged woolly surface, and somewhat like little rolled balls of cotton or wool. These commonly but not always sink in water. This kind of expectoration has appeared to me most common in young subjects, of a strongly marked strumous habit, and in whom the disease was hereditary. At other times, in the cases in which these globular masses are observed, and also in those in which they have not appeared, the expectoration puts on the common characters of the pus of an abscess, constituting an uniform, smooth, coherent, or diffluent mass, of a greenish, or rather greyish hue, with an occasional tinge of red, (from intermixed blood,) and sometimes more or less fetid. This is the "sputum cinereum et cænosum, argillæ cujusdam liquidioris speciem præ se ferens" of Bennet. It is unnecessary to take any notice, in this place, of the point once so much discussed and deemed so important, of the difference between pus and mucus, and of the chemical tests of each; since it has been long ascertained that a mucous membrane in a state of inflammation, is as capable of secreting true pus, as an ulcerated surface. The alleged sweetness or saltness of the expectoration, has also, I believe, been long discarded by pathologists as a test of the existence of tubercular disease of the lungs, although we certainly much more frequently hear our phthisical patients notice these qualities of the expectoration, than persons affected with other diseases of the chest.—*Transl.*

These notions, although very inaccurate in several respects, are still entertained by many physicians who are ignorant of the present state of pathological anatomy. In one very important point, that of the origin of the affection, these views of Hippocrates are erroneous; since, as has already been shown, the formation of an abscess in the lungs, the consequence of inflammation, is an extremely rare case,—at least a hundred times as rare as a well-marked vomica, and a thousand times as rare as an empyema. I consider vomicæ, such as I have described, and such as are so named by practitioners, as the result of the softening of a tuberculous mass of a large size. It is to be remarked, however, that the copious expectoration which usually takes place during several days after their rupture, cannot be considered as the sole product of the tuberculous matter. In a case formerly under my care, the patient, after having, for several months, been subject to dry cough, dyspnœa, hectic fever, and other symptoms indicative of tubercles, after a violent fit of coughing suddenly expectorated nearly a glassful of puriform matter, which was opaque and almost diffluent. For eight days afterwards, he brought up about three pints of a similar fluid every twenty-four hours. The expectoration then gradually subsided, and at last ceased entirely, together with the symptoms which had preceded it; and the patient left the hospital, at the end of a month, perfectly cured. A discharge so copious as this can only be accounted for by secretion; and in the case in question, there is no doubt that the sources of the expectoration were the walls of a large tuberculous excavation, and the bronchial membrane irritated by the discharge of the contents of this.

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[*] That Hippocrates was well acquainted with *Succussion* as a means of diagnosis in thoracic diseases, is evident from many passages in his writings; and he is even entitled to the merit of having practised *auscultation* (though without any useful result) by the application of the ear to the chest, as is indeed noticed by M. Laennec in the beginning of the present work. Not contented with this, Dr. Baron in his "Illustrations," contends that he was acquainted also with *Percussion*. This I conceive to be an opinion not at all supported by a candid examination of the writings of Hippocrates.—*Transl.*

It is to be remarked in this place, that the case known in practice by the term *vomica*, and which is justly considered as uncommon, differs in nothing but degree from a case which is very common, and which may be frequently observed in an hospital, by any one who carefully attends to the expectoration of a great number of phthisical patients. Some other affections have been frequently confounded, under the name of *vomica*, with that just described; and particularly abscess of the lungs, abscess of the liver opened through the diaphragm into the chest, and the effusions of pleurisy which have found their way into the bronchi.

The general symptoms above described, which accompany manifest phthisis, cannot be considered, even when re-united in the same case, as certain signs of the existence of tubercles in the lungs. A simple catarrh may give rise to the same effects. Twenty years ago I witnessed the death of a young woman, preceded by all the symptoms of phthisis pulmonalis, whose lungs were found, on examination, perfectly sound, and in whom no organic lesion was discoverable, except in the liver. Bayle gives two examples of the same kind, (Cases xlviii. and xlix.) On this account, we ought never to assert positively the existence of phthisis pulmonalis, in cases where none of the physical signs afforded by percussion and auscultation, are found to exist. In the course of the last year, I several times met MM. Recamier and Richerand in consultation, on the case of a young lady who seemed already far gone in a consumption, but in whom I constantly affirmed the lungs to be sound, from the absence of physical signs in this case. The result of the dissection confirmed the correctness of my diagnosis: the disease was schirrous pancreas, complicated with a simple catarrh.

2. *Irregular manifest phthisis.*—I wish to designate by this term, those cases of phthisis, in which the disease seems to begin in some other organ besides the lungs. It is by no means uncommon to find the local and general symptoms of consumption, preceded by a chronic diarrhœa of long standing. On examining the bodies of such persons after death, we find a great many ulcers in the intestines, and in most of these, small miliary tubercles, or tubercles already softened and destroyed. When in such cases perforation of the intestinal tunics takes place, an acute peritonitis, accompanied by peritoneal tympany, commonly supervenes suddenly. This double affection is indicated by the following signs: viz. sudden, acute, and sometimes most extreme pain of the belly, great alteration of the features, and complete prostration of strength. The pain is increased by pressure, but usually less so than in most cases of acute peritonitis. In gently

compressing the abdomen, or in pressing with a single finger the parts of it which are most swollen, we are sensible of a sort of dry crepitation; and in percussing the part gently, while at the same time we apply the stethoscope near it, we hear a silvery sort of resonance, more clear than in common intestinal tympany. If the adhesion of the ulcer to the parts surrounding it, takes place immediately, these signs in general, do not exist at all. Perforation of the intestines from tuberculous ulcers may also take place, though more rarely, in examples of regular phthisis, and when the intestinal affection shows itself only at an advanced period of the disease.[*] The examples of consumption which are preceded by a prolonged diarrhœa [†], are usually attended by a greater emaciation and prostration of strength than in common cases; in them the skin is also harsh, and has none of that fineness, and that pallid white and waxen hue, which exist in the greater number of common consumptive subjects. In these cases also, death soon follows the establishment of the expectoration and other local pectoral symptoms; although, indeed, by means of the stethoscope, the existence of tubercles already softened or even excavated, might have been previously ascertained. In scrophulous subjects, particularly children, the tuberculous affection begins, pretty frequently, in the mesenteric or cervical glands, the tubercles in the lungs (occasionally few in number) being most commonly the result of a secondary eruption. Sometimes even, in subjects of this kind, we meet only with tubercles in the large bronchial glands at the roots of the lungs. When tuberculous phthisis begins in the mesenteric glands, death frequently supervenes from defective nutrition, before any symptom of pulmonary consumption shows itself. In examining the bodies of such subjects, however, we almost always meet with some miliary tubercles in the lungs.

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[*] For the best account we possess of perforation of the intestines, see the articles *Enteritis*, *Peritonitis*, and *Perforation*, in the Cyclopædia of Pract. Med.—*Transl.*

[†] For the most valuable illustrations respecting the nature and degree of prevalence of diarrhœa in phthisis which we possess, I must still refer the reader to the works of Audral and Louis. I shall here abridge some of the observations of these authors, particularly the latter. Out of one hundred and twelve cases of phthisis, diarrhœa was wanting in five only. In some, it preceded any sign of phthisis pulmonalis; in about one-eighth, it began at the same time as the disease of the lungs, and attended its whole course, from five to twelve months, and even, in some cases, during the greater part of four or five years; in the majority of cases, it began in the latter half of the existence of phthisis; and in one-fourth, it appeared only between the fiftieth and twentieth day preceding death. In these cases, which may be called *the diarrhœa of the latter days*, the intestines were found diseased in every case but one: in one-half, there was ulceration of the mucous membrane either of the small or large intestines, or both, and in every case but three, the ulcers were small and rare; in four-fifths of the cases, the mucous membrane of the colon was reduced to a soft pulp, and was almost always more or less red. The diarrhœa was proportioned to the extent of the organic lesion, and was greater when the membrane was softened, than when it was simply ulcerated. *The diarrhœa of long standing* was either *remittent* or *continued*. In the former kind, which was observed in fifteen cases, the lesions were the same as in the variety just described, being comparatively slight. The diarrhœa continued from forty-eight days to five months, and the remissions lasted eight, ten, fifteen, or twenty days. *The continued diarrhœa of long standing* lasted from one to twelve months. Out of forty-one cases, the small intestines were ulcerated in thirty-five, the large in thirty-one; in twelve cases, the small intestines were ulcerated through their whole course, and in thirteen, the ulcers were as large as an inch in diameter; in nineteen cases there were large ulcerations in the great intestines; in thirty, the mucous membrane of these was of a pulpy softness, and in seventeen it was red. As a general rule, it was found, that when the diarrhœa had been of long standing and continued, the ulcers were large and numerous. The diarrhœa was found to be as severe when the ulcers were in the small, as when they were in the large intestines; but the much greater frequency of *softening* of the membrane of the latter, (which appears to be the consequence of inflammation,) proves that the site of this symptom is much more commonly in the large than the small intestines. In every case where there was much ulceration, the diarrhœa was not only of long duration and continued, but the stools were also *frequent*; and the loss of strength, and the emaciation, were always proportioned to the number and frequency of the stools. There appears to be no just foundation for the common opinion, of diarrhœa alternating with the sweating in phthisis, or the one being supplementary of the other.—*Transl.*

3. *Latent phthisis.*—It very seldom happens that phthisis is latent through its whole course; but it is by no means rare to meet with cases in which the characteristic symptoms show themselves only a few weeks, or even days, before death; and which had been previously mistaken for diseases of quite a different nature. Cases of this kind occur most commonly during the course of another chronic disease, capable by itself of occasioning emaciation and slow fever, such as scurvy, inveterate syphilis, &c. These scorbutic, venereal, or mercurial consumptions, as they are usually called, have nothing peculiar, except in being developed during the presence of the affections mentioned; and to which, in fact, there is no proof of their being owing. Some cases of phthisis, beginning with diarrhœa, prove fatal, without being ever attended by cough or expectoration, as was formerly observed by M. Portal; but in such instances, crude tubercles are usually found in the lungs. Phthisis may be long masked by nervous symptoms. I have known several cases in which it was concealed for years by an habitual dyspepsia, and other symptoms of hypochondriasis. One of these, a confirmed hypochondriac of ten years, and who still preserved his strength and plumpness, was suddenly attacked with an acute catarrh, which was succeeded, after five days, by an expectoration of puriform mucus, mixed with a little blood. These symptoms subsided in the course of a few days; but after six months they were succeeded by symptoms of a decided phthisis, which carried the patient off within six weeks. Of all the affections of the lungs, the pulmonary catarrh is the most apt to mask phthisis; since, on the one hand, it may itself be accompanied by hæmoptysis, hectic fever, considerable emaciation, and an expectoration which it is impossible to distinguish from that of phthisis; and, on the other, the symptomatic catarrh of phthisis may last several months, and without emaciation or fever. In respect of fever, it may be stated, that it is in general less considerable, the fewer the tubercles, and the more unconnected they are with one another. We may indeed say that the greater

number of cases of phthisis are latent at the beginning, since we have seen that nothing is more common than to find numerous miliary tubercles in lungs otherwise quite healthy, and in subjects who had never shown any symptoms of consumption. On the other hand, from considering the great number of phthisical and other subjects in whom cicatrices are found in the summit of the lungs, I think it is more than probable that hardly any person is carried off by a first attack of phthisis. Since I was first led to adopt this opinion, on anatomical grounds, it has frequently appeared quite clear to me, from carefully comparing the history of my patients with the appearances on dissection, that the greater number of those first attacks are mistaken for slight colds, and that others are quite latent, being unaccompanied with either cough or expectoration, or indeed with any symptom sufficient to impress the memory of the patients themselves. Case XX. affords an example of this; and probably in Cases XVII. XVIII. XIX. XXI. XXII. XXIII. the defect of information respecting the symptoms that accompanied the formation of the cicatrices found after death, arose from those symptoms having been so slight, as to have escaped the memory if not the notice of the patient.*

4. *Acute phthisis.*—Under this term are included those cases, which, after remaining latent for a longer or a shorter period, at length unfold themselves all at once, with acute fever, emaciation, and other symptoms of such severity as to carry off the patient at the end of six weeks, a month, or even sometimes within a shorter period. In examining the lungs, in cases of this kind, we commonly meet with a great number of tuberculous masses, or separate tubercles, which have softened simultaneously, or we find secondary eruptions of great extent, and already considerably advanced in their progress. In one remarkable variety of acute phthisis, the patients sink under the violence of the fever, previously to emaciation, and without any other local symptoms but those of a very severe acute catarrh. In this case we commonly find, on examining the body, a great number of crude yellow tubercles, more or less softened, and of considerable size, and almost always without any secondary eruption. These cases form exceptions to the usual course of the disease mentioned above; the primary eruption of tubercles having been, in them, very numerous, and having remained latent until the softening of them

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* Out of one hundred and twenty-three cases of phthisis observed by M. Louis, eight were *latent*, that is, exhibited neither cough nor other pectoral symptoms during a period varying from five months to two years. In four of these cases, during the period of latency, there were neither local nor general symptoms; in the others, there was considerable general disturbance, viz. fever, anorexia, emaciation, &c. long before the supervention of the pulmonary symptoms. *Recherches*, p. 368. For some valuable and interesting observations on that variety of latent phthisis which begins with diarrhœa, see Andral's work, t. iii. p. 323. It is noticed by Morton, under the head *Tabes a dysenteriá et diarrhœá*, Phthisiologia, p. 38. Every practitioner, as well as myself, has, no doubt, met with instances of this sort.—*Transl.*

gave occasion to the symptoms of the violent pulmonary catarrh. I met with a remarkable instance of this kind about twenty years ago, in the case of a girl, eighteen years of age, who died in the Hospital *Cochin*, without any emaciation, or other symptom, except those of a severe feverish catarrh, of less than a month's duration. Upon examining the body, the lungs were found filled with tubercles more or less softened, of a size almost uniform, and none less than a filbert or almond.*

5. *Chronic phthisis.*—Under this name we may include those cases which last sometimes five or six years, or even much longer, marked by periods of increase, during which the hectic fever is manifest, and emaciation makes rapid progress; and by remissions of longer or shorter duration, and sometimes so complete, that the fever, cough, and expectoration cease, and the patient recovers his flesh. Cases of this kind, as must appear from what is stated above, are the consequence of successive eruptions of tubercles, usually also few in number. It is in these that the pulmonary cicatrices are most commonly found.

From all that has gone before, it appears to me useless to talk of dividing consumption into two or three degrees,—*phthisis incipiens, confirmata, desperata.* This kind of distinction, being founded on the greater or less development of the general symptoms, has nothing fixed or constant; since we scarcely ever find these general symptoms proportioned to the state of the expectoration, or to the extent of the organic lesions, in the lungs. Hectic fever and emaciation frequently exist in a high degree previously to the appearance of the yellow and opaque sputa, and even prove fatal with the single addition of dyspnœa. At other times, on the contrary, the natural plumpness of the individual, and a very tolerable degree of general health continue, for a considerable period after the supervention of the opaque expectoration and pectoriloquism.

SECT. VII.—*Treatment of phthisis pulmonalis.*

It has been shown above, that the cure of phthisis is not beyond the powers of nature; but it must be admitted, at the same time, that art possesses no certain means of attaining this desirable end. To be convinced of this, we need only give a glance innumerable remedies that have been proposed for its cure.* well assured that a disease is irremediable, when we yed in its treatment almost every known medicament, er different or even opposite in effect; when we see new es proposed every day, and old ones revived, after having in merited oblivion; when, in short, we find no plan ar t that of giving palliatives, and no means persevered ut such as are proper for fulfilling indications purely symp- tic. On these grounds, have been alternately cried up— is, and acids; spare diet and rich animal diet; dry air and o air; pure air and air impregnated with fetid vapours; ygen, hydrogen, and carbonic acid; exercise and quiet; emol- nts and tonics; heat and cold; paregoric and other anodynes d stimulants,—not only of the aromatic and antiscorbutic kind, t the most irritating preparations of mercury, the sulphate of senic, &c.†

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* For several interesting examples of acute phthisis, I refer the reader to Louis's work, p. 411, and to Andral's, p. 367. Of the general progress and duration of this disease, a more precise idea will be afforded by the following statement of the results obtained by MM. Bayle and Louis. Out of three hundred and fourteen cases, twenty-four died within three months; sixty-nine from three to six months; sixty-nine from six to nine months; thirty-two from nine to twelve months; forty-three from twelve to eighteen months; thirty from eighteen months to two years; twelve from two to three years; eleven from three to four years; five from four to five years; one from five to six years; three from six to seven years; one from seven to eight years; three from eight to ten years; eleven from ten to forty years.—*Transl.*

e view of reducing to some order, so sterile a super- ty, I shall enquire, in the first place, what are the indications e fulfilled in the treatment of phthisis; in the next place I l enquire whether experience has led us to the knowledge of means really efficacious in its cure; and lastly, I shall give account of the means calculated to fulfil the symptomatic cations. From the facts formerly detailed, exhibiting the de in which nature sometimes cures phthisis, it results, that the most rational indications should be, as soon as we have ascertained the existence of the disease, to prevent the secondary eruption of tubercles; as, in this case, if the primary tubercular masses were not extremely large or numerous, which they very seldom are, a cure would necessarily take place after they are softened and evacuated. The second indication should be, to promote the softening and evacuation or absorption of the existing crop of tubercles. Although the first of these indications, like the facts on which it rests, is new, nevertheless, all the means which have been thought best calculated to fulfil it, have been put in practice from time immemorial; it having always been the common endeavour of physicians, to prevent the developement of phthisis in subjects threatened with it, either from constitutional predisposition, or from the actual presence of unpleasant symptoms. I have formerly proved that, in the latter class of cases, the mischief is already done, inasmuch as the first symptoms general and local, and even the physical signs, do not show themselves very often until long after the formation of tubercles. Nevertheless, I shall here notice the means which have been, in their turns, cried up as calculated to prevent the developement of tubercles. Of these bleeding and derivatives are the chief. Stoll recommends small bleedings frequently repeated, and gradually diminished in extent,—a precept rendered the more necessary by the progressive diminution of the patient's strength. The greater number of physicians who have employed this remedy, have not considered it as a means of curing or even preventing phthisis, but only as calculated to allay the inflammatory affections with which this is sometimes complicated. M. Broussais, however, has maintained the former proposition. "In putting a stop (he says) to these three kinds of inflammation *(catarrh, mild pneumonia,* and *pleurisy)* by very active treatment at their onset, I rendered the occurrence of phthisis very rare, whatever be the constitutional predisposition of the patient." *(Doct. Méd.* p. 686.) The reader will be able to judge of the truth and probability of this statement, from the contents of the preceding sections. I shall content myself with asserting briefly, in this place, that bleeding can neither prevent the formation of tubercles nor cure them when formed. It ought never to be employed in the treatment of consumption except to remove inflammation or active determinations of blood, with which the disease may be complicated; beyond this, its operation can only tend to an useless loss of strength.[*] I am even of opinion that the same reasoning is applicable to the catamenial discharge. I have already said that the suppression of this is, in most cases, the effect and not the cause of the formation of tubercles; and as long as these continue to form and to increase in size, with the attendant general symptoms, it is at least useless to attempt to restore the process. At the same time, should there arise, in such cases, a sufficient indication for taking away blood, I am of opinion that it may be more beneficially obtained by the application of leeches to the inner part of the thighs, than in any other manner.

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* See *Ploucquet's* Litteratura Med. Digesta. *verb.* PHTHISIS.—*Author.*

† Ploucquet. Op. Cit.

The actual cautery and issues would seem to present the most rational means for preventing the formation of tubercles, as well primarily as a secondary eruption of them. This method is very ancient. Hippocrates directed four eschars with a red hot iron below the axilla, on the breast or back. Celsus recommends six—one beneath the chin, one on the throat, one under each nipple, and one at the lower angle of each scapula. I have used extensively these cauteries, both actual and potential, in the treatment of phthisis, and I must confess that I have never ob-almost a cure in any case where they were employed. I have commonly applied them beneath the clavicle, or in the supra-spinous fossa; and in some patients I have repeated the application of the searing iron as many as twelve or fifteen times. It is, however, only a very small number of patients that will submit to a mode of treatment so horribly painful. Small moxas, of about a line in diameter, applied two or three at a time, and successively, have appeared to me more useful than the searing iron; as under their employment I have sometimes seen a very striking suspension of all the symptoms. At all events, I have now almost entirely renounced the use of the actual cautery. Measures so painful ought not to be had recourse to, unless they are [illegible] by experience to hold out a reasonable hope of success. For this reason, I now restrict myself to the application of the caustic potass in the places above mentioned, so as to form eschars of eight or ten lines in diameter: and I do not even insist upon this if the patient is very averse to it. In regard to blisters and permanent issues, so common in practice, I think it will be admitted by all practitioners that little benefit is produced by them after phthisis is fully formed, while they are frequently very inconvenient from the local irritation which they occasion. They ought never to be applied to the chest itself: for, although in this situation, they sometimes produce temporary relief when there are acute pains, they also frequently give rise to a determination of blood to the thoracic organs, and more particularly [illegible] either from custom or the wish of the patient, I prescribe a blister, I usually direct it to be applied to the inner part of the thigh [illegible] because this affords a broader surface than the arm, and because, in women, the indication of restoring the catamenia gives it an additional propriety. Some practitioners have of late years attempted to apply the cautery to the [illegible] and to produce an artificial fistula by means of [illegible]. But I have neither seen nor heard any thing which [illegible] more useful than the others. The same may be said of the establishment of discharges from the skin in general, except in those cases in which the suppression of an habitual discharge, or the retrocession of a cutaneous eruption, has appeared to be the exciting cause of the disease.*

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[*] Bloodletting has been a favourite remedy with many physicians of great eminence. In this country, its advantages have been strongly advocated by Dover, Pringle, Fothergill, Stark, Watt, and others. The first and last mentioned authors carried the practice to a very great extent; and the latter advocated its utility on a most singular principle, viz. that of producing a febrile re-action, with the view of "restoring the blood," and thereby curing the disease. See "Cases of Diabetes," &c. by R. Watt, 1808, p. 277. I have seen bloodletting much employed, and have myself used it much, in this disease. I have seen great benefit derived from it, but chiefly in relieving the inflammatory complications of phthisis. With our present knowledge of its pathology, it can hardly be expected to benefit the tuberculous affection, and my experience leads me to condemn its use in every case of pure phthisis. —*Transl.*

[illegible] *the tubercles.*—The means which have been proposed to fulfil this indication, have been [illegible] according to the prevailing [illegible] the intention of healing the internal ulcers and promoting the expectoration. Of this kind is the deobstruent or attenuant alkaline treatment formerly mentioned, by means of lime-water, the natural and artificial sulphureous waters, internally or externally, sal amoniac, the subcarbonates of ammonia and soda, nitrate of potass, hydro-chlorate of soda, &c.* We must admit that these means sometimes promote expectoration, and they seem calculated to hasten the softening of the tuberculous matter. However, judging from their slowness at least, and frequent inefficacy against tubercles in the glands, we ought hardly to expect much from them in the case of pulmonary tubercles. The same remark applies to the hydro-chlorate of lime, the preparations of mercury, the hydro-chlorate of barytes, and even the preparations of antimony, which are in fact only useful in promoting expectoration, or in opposing an intercurrent pneumonia. It is with the view of cicatrizing the internal ulcers that different practitioners have recommended plants of an antiscorbutic and aromatic kind, purgatives, balsamics, particularly the balsams of Tolu, Peru, and Mecca, turpentine, camphor, sulphur dissolved in volatile oils, &c. The same end has been sought to be attained by mixing with the air breathed by the patient, certain gases, so as to produce an artificial atmosphere. The limited extent to which such practices have been carried, sufficiently proves the little confidence to be reposed in them. On this principle, have been cried up, in their turn, the vapours from decoctions of plants of an emollient, aromatic, narcotic, or balsamic kind; the fumes of different kinds of resin burned on a hot iron or a brazier, particularly those of myrrh, benzoin,

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* [illegible] recommended in this country by [illegible] perpetual blisters, and [illegible] and again [illegible] has been again strongly recommended [illegible] 1828. I have tried the [illegible]—Transl.

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* For some remarks on the alkaline or deobstruent treatment of diseases, see page 227. In the work of Dr. Farnese there referred to, (p. 110,) the author speaks highly of the powers of carbonate of potass (from a drachm to an ounce, in half a pint of water daily,) in phthisis, and adduces his own case as an instance of a complete cure effected by it. It is somewhat singular that among the alleged deobstruents or sorbefacients, our author takes no notice of one of the most potent of these, Iodine. From its remarkable powers in removing bronchocele, and in reducing the size of diseased lymphatic glands on the surface of the body, the employment of Iodine in pulmonary tubercles, was at once prompted and justified by the fairest analogy. As far as I know, Dr. Baron was the first to make trial of it in this case (see "Illustrations of the enquiry respecting tuberculous diseases," p. 225); and the only accounts I have met with of its effects in phthisis, are those given in his work, and in a small pamphlet by Dr. Gardiner, "On the effects of Iodine," published in 1824. Both these accounts, however, are extremely meagre, and afford no ground for expecting benefit from this remedy, beyond what were already supplied by analogy. It is, however, certainly deserving of further trial; more especially since the case may be fairly considered as hopeless, and since the researches of several physicians, as well in this country as on the continent, have proved this new remedy to be efficacious in many other diseases besides bronchocele. See particularly, professor Brera's *Saggio clinico sull' Iodio*, Padua, 1822, Dr. Manson's *Medical Researches on Iodine*, Lond. 1825, and above all Lugol's recent work on Scrofula, translated by Dr. O'Shaughnessey. I have myself used iodine very extensively in bronchocele (which is endemic in many parts of Sussex), and with almost uniform success. I must say, however, that my experience as to its occasionally injurious effects on the system, is more in accordance with that of Brera than of Dr. Manson.—*Transl.*

chronic catarrhs; and it is possible that, from a peculia
syncracy in particular persons, even the most absurd of th
have been beneficial, at least as palliatives, in changing fo
the existing character of the sensibility of the lung
relieving some distressing symptoms. I have fre
known the inspiration of stimulant vapours put an end
pains of the chest or dyspnœa, after narcotic and emolli
pours had been employed without success.

Empirical means. A great many of the remedies a
mentioned might very properly be ranged under this he

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* For a full account of the mode of using, and the alleged utility of tar
refer the reader to Sir A. Crichton's "Practical observations on Consu
Lond. 1823. (See also the note, p. 74.) I have made some trial of this
without benefit certainly, in every case, and occasionally with temporary in
cough and irritation.—*Transl.*

† The inhalation of Chlorine, noticed in a former note (p. 74) first intro
M. Gannal, has been much used of late years in the different stages of phth
with effects extremely problematical. The facts adduced by M. Gannal
thing but conclusive: most of his patients had only chronic catarrhs, an
phthisis evidently existed, no cure ensued. (*Revue Méd.* Fev., Août, 1828.)
adduced by M. Bayle in the same Journal (Nov. 1829) prove nothing more
twelve patients only one was cured, and there existed no certain proof that
a case of true phthisis. I say nothing of certain other cases of cured phth
lished in some half-medical journals, as they are so larded with the va
quackery that it is impossible to put any faith in them. On the other han
pulous and impartial observers, among whom I would name my brother, I
broise Laennec of Nantes, Dr. Toulmouche of Rennes and Drs. Flandin an
of Paris, have administered the chlorine gas to a considerable number of p
subjects, not only without success, but sometimes with positive disadvan
have myself frequently employed it, without ill effects certainly, but with
benefit whatever. All my patients, it is true, were pectoriloquous, and in this
the disease M. Gannal says the remedy is not effective: but surely if it were
of discussing crude tubercles, it would be no less able to produce cicatri
tuberculous excavations.—(*M. L.*)

I do not think the concluding inference of my brother annotator quite le
as it is very conceivable that tubercles may be absorbed from a tissue otherw
paratively sound, and yet that an ulcer which succeeds to them may not be h
the same means. I, however, entirely subscribe to the judgment he has pass

though an attempt has been made to class them according to the indications they are supposed capable of fulfilling. I shall content myself with merely enumerating several others, the inefficacy of which has been sufficiently demonstrated. Of this kind are—mercurial salivation; emetics frequently repeated, or continued for a long period in doses sufficient to excite nausea merely; acorns, roasted or raw; charcoal; different kinds of mushrooms, and among others, the *boletus suaveolens* and the *agaricus piperatus* and *deliciosus;* red cabbage; crabs, oysters, and other shell-fish; frogs; vipers; chocolate; the conserve and sugar of roses in large doses; wine and spirits; sudorifics; electricity; millepedes; opium; cicuta; wolfsbane; cinchona; the seeds of the *phellandrium aquaticum;* the preparations of lead; hydrocyanic acid;* the swing, formerly recommended by Themison (apud Cæl: Aurel.) and revived by the moderns, &c. &c.

Of all the measures hitherto recommended for the cure of phthisis, none has been followed more frequently by the suspension or complete cessation of the disease, than change of situation.†

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* Hydrocyanic acid, as existing in laurel water, appears to have been employed as a remedy for coughs and consumption before the middle of last century. After the discovery of the acid in the beginning of the present century, it was employed by the Italian physicians, particularly Brera, as a sedative, in diseases of excitement, and also in coughs and tubercular phthisis. About ten years since, it was introduced more particularly to the notice of the profession, by M. Magendie, in France, and Dr. Granville in England, and was at the time, and has been since, very extensively used in phthisis. I have myself used it; and regret to think, that the results not merely of my own experience, but those even of its best advocates, when critically examined, lead to the conclusion, which might have been anticipated, that it is utterly powerless in curing tuberculous consumption. As a sedative, it is certainly occasionally useful in quieting the cough. See Dr. Granville's "Historical and Practical Treatise on Hydrocyanic acid." Second Ed. London. 1820.—*Transl.*

† During a residence of five years at Penzance in Cornwall, a place much frequented by consumptive patients on account of the extreme mildness and equability of its temperature, I had extensive opportunities of observing the effect of change of climate in phthisis; and I am sorry to say that, in the greater number of cases, the change was not beneficial. This result, however, must not, in fairness, be considered as derogating, in any considerable degree, either from the propriety of the practice or the fitness of the situation; since it must be confessed, that very few of the invalids came to Penzance in that period of the disease when a cure could be expected, if, indeed, it were even possible. In no case of well marked tubercular phthisis, did I witness a cure, or even a temporary alleviation, that could fairly be attributed to change of climate. In a good many cases, however, of chronic bronchitis, simulating phthisis, the health was greatly improved, and in some it was completely restored, from a state of great debility and seeming danger. In a few cases, also, of young persons who accompanied their diseased relatives, and in whom the hereditary predisposition was strongly marked, if there was not already evidence of nascent tubercles,—a great and striking improvement in the general health and strength, followed within a short period after their arrival, and seemed fairly attributable to the combined influence of change of air, scene and habits. In point of mildness and equability of temperature, Penzance exceeds every other situation frequented by invalids in this island, and comes not very far short, in this respect, of some places in the south of France and north of Italy. (See my "Observations on the climate of Penzance," Lond. 1820.) Like the whole south of England, however, it is very inferior to the places just mentioned in point of *dryness*, the number of days on which rain falls being very great; and on this account, the benefit to be expected from its mildness of temperature, is often more than counterbalanced by the

It is even probable that the good effects of mineral waters are partly owing to this cause; since we find that these are by themselves of only very dubious efficacy, while many consumptive

frequent inability of the invalid to take exercise in the open air. It is proper to mention that, as at Marseilles, Nice, Rome, and other favourite spots on the continent, consumption is as frequent at Penzance as elsewhere.

For the succeeding portion of this note I am indebted to my friend Dr. Clark, late of Rome, but now resident in London; whose opportunities of witnessing the influence of climate in consumption, have been, perhaps, unequalled, and whose accuracy of observation and soundness of judgment are, at least, equal to his opportunities. I am happy to say that Dr. Clark is at this time, preparing for publication a work on the effect of climate on consumption and other diseases, which, I doubt not, will throw great light on the subject now under consideration.

"I consider consumption, with your distinguished author, as a disease very generally consequent to a deranged or cachectic state of the general system, originating in a series of functional disorders, and often favoured by an hereditary predisposition to tubercles. When adopted for the removal of this state of the system, and previously to the actual development of tubercles in the lungs, I look upon *change to a milder climate* as a measure of the utmost importance, and likely, when well-timed and combined with such other treatment as the case may require, to go a great way to the attainment of this most desirable object. If the mischief has advanced a little further, and there are good reasons for believing that tubercles are already formed in the lungs, more especially if a disposition to inflammation of these organs or to hæmoptysis has manifested itself; then, change of climate becomes a more doubtful measure; and, unless adopted with judgment and with some precaution, may accelerate rather than retard the progress of the disease. In cases of this kind, it will be necessary, previously to undertaking the journey, to remove, or at least to moderate, the most evident and important of the functional derangements, to subdue excitement, and diminish phethora. Much evil has arisen from inattention to these precautions. Medical men in general seem hardly sufficiently aware of the great excitement produced in the system by travelling, and of the necessity, therefore, of removing those morbid complications most likely to suffer aggravation from this. If the disease has made still greater progress, and the cough, expectoration, emaciation, hectic fever, *and the results of auscultation*, leave no doubt of the advanced stage of the tubercles, the mischief to be apprehended from the exposure, the fatigue, the irritation and excitement of a long journey, is greatly increased; and under such circumstances, generally speaking, no advantage is to be expected from the change, and very often the fatal termination will be accelerated by it. But should the symptoms just enumerated, from whatever cause, have become much mitigated, and more especially if there is reason to believe, from a careful examination of the chest, that the disease is confined to a small portion of the lungs; then, a residence in a milder climate affords the best opportunity of aiding the efforts of nature in the work of reparation; and, by contributing to the re-establishment of the general health, will tend to prevent the further formation of tubercles.

"A change of climate having been decided on; the particular situation to be selected becomes a question. Professor Laennec's decided preference of a maritime residence is not, perhaps, founded on a very extensive experience; certain it is, however, that as well in this country as on the continent, the places usually resorted to by consumptive invalids, are on the sea-coast, or at no great distance from it. On the continent, the places chiefly frequented, and which I have had an opportunity of observing, are Hyères in the south of France, Nice in Piedmont, Pisa, Rome, and Naples in Italy. Each of these places may have some advantages when compared with the others, and when considered in reference to each individual case. The constitution of the patient, the co-existence of other diseased states with the pulmonary affection, the previous abode and habits of the patient, &c. &c. must be taken into account in fixing the decision. In almost every case, when the removal to a milder climate can be conveniently effected by sea, this means is much preferable to a journey by land; in some cases, the good effects produced by a voyage are very remarkable."

George Street, May 2nd. 1827.

Since the date of the foregoing note, Dr. Clark has given to the world his invaluable work on the Influence of Climate in Chronic Diseases, a work which contains persons find themselves benefited by a residence in their vicinity, although unable to take the waters either internally or externally. We find, however, that the air of mountains is far from agreeing with all consumptive patients; and it seems probable that those with whom it agrees have only a small number of tubercles in the lungs; since it would appear that though phthisis is infrequent in mountainous countries, when it occurs, it runs a very rapid course. The air of the country agrees in general better than that of the town; and the air of warm climates better than that of cold. A residence by the seaside, particularly in mild and temperate climates, is unquestionably the situation in which most consumptive patients have been known to recover. On this point both the ancients and the moderns seem agreed. Aretæus recommends sailing, and the air of the seashore. Celsus advises a voyage to Egypt. For a vast number of years, the physicians of nearly the whole of Europe have sent their patients to Hyères and Nice: and in addition to these, the English recommend the coast of Devonshire and the Canary Islands. I formerly mentioned the infrequency of phthisis on the coast of Bretagne. Indeed, I am convinced, that in the actual state of our knowledge, we have no better means to oppose to this disease, than a sea voyage and a residence on the seacoast, in a mild climate; and, accordingly, I always recommend these when practicable. Last winter I made an attempt in a small ward of the Clinical Hospital, to establish an artificial marine atmosphere by means of fresh sea-weed *(fucus verrucosus)*. Twelve consumptive patients were subjected to this treatment for four months. In all of them the disease remained stationary; and in some, the emaciation and hectic fever were sensibly lessened. Nine of them, considering themselves cured, left the hospital, although I must admit that only one of these afforded any real hope of cure. Our supply of sea-weed having failed towards spring, owing to the difficulty of conveying it, the disease, from this time, assumed a rapid progress in the three remaining patients, and speedily carried them to the grave.[*]

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much more useful practical knowledge respecting the treatment of phthisis. More recently the same distinguished physician has enriched the Cyclopædia of Practical Medicine with a complete Treatise on Consumption (vol. iv. *Supplement*), which leaves at a great distance, as to accurate and comprehensive pathological views and the true principles of prevention and treatment, every work hitherto published on the subject. It is to be hoped that Dr. Clark will soon publish this treatise in a separate form.—*Transl.*

[*] I cannot pass, without remark, the imbecility of this statement, and the overweening and unjustifiable confidence in the principle on which the practice was founded. If "a marine atmosphere" alone sufficed for the cure of phthisis, happy would it be for us and all other islanders, who could so easily enjoy the benefit of its influence, in all its natural perfection, and without the aid of stinking sea-weed! But not only are the inhabitants of coasts and islands as much subject to phthisis as those of inland countries, but even those who might seem placed in the most favourable of

Palliative treatment of symptoms.—If we are destitute of every direct and effectual means of resisting this disease, we are, at least, able, in many cases, to alleviate its troublesome symptoms, such as the cough, dyspnœa, night-sweats, and diarrhœa. For quieting the cough, emollient drinks, and alimentary matters of a mucilaginous nature, have been always in use,—such as milk, (woman's, ass's, cow's, goat's, mare's,) saloop, sago, gum, Iceland moss, potato-starch, arrow-root, barley, rice, sugar, and the infusions of inert mucilaginous plants, properly sweetened. When the cough is dry, and the expectoration difficult, also when there is a want of sleep, opium in small doses, or any other narcotic extract, is added with advantage. The hydrocyanic acid also sometimes succeeds very well in relieving the cough and even the dyspnœa; but its effects are less certain than those of opium. Antimonials, although at different times much cried up, have never appeared to me of great efficacy, even in aiding expectoration. The diarrhœa must be also treated by mucilaginous drinks, and the milder preparations of opium. However, when it depends on the presence of tuberculous ulcers in the intestines, as it almost always does, we can only hope at best to suspend its violence; and we cannot always even effect this. The acetate of lead appears sometimes to moderate this symptom; but it is much more efficacious in lessening the perspirations: indeed it is almost the only means we can oppose to these. Dyspnœa must be combated by the preparations of opium and other narcotic plants. The hydrocyanic acid and musk are also sometimes beneficial in this respect. I speak not here of pulmonary congestions, whether terminating in inflammation, hæmorrhage, or serous effusion. I shall merely remark, that, in these cases, we must not take away more blood than is absolutely necessary to relieve the symptoms, since bleedings, either too copious or too frequent, have an evident effect in accelerating the progress of the disease.

From all that goes before, I think we must come to the conclusion recorded in the beginning of this section, that although the cure of tuberculous phthisis be possible for nature, it is not so for medicine. Even the most rational of our indications, that of derivation, obtains no support from experience. Nor is this the mode followed by nature in her cures, as we very seldom find any evacuation coinciding with the convalescence: the return of the catamenia, or hæmorrhoids, is rather the effect than the cause of the cure. In order to make a direct attack upon the disease, we

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all circumstances for escaping this malady,—I mean, the natives of *small islands in mild and warm climates*; for instance, Malta, Madeira, and the other Atlantic islands. See Dr. Sutton's papers in the Lond. Med. and Phys. Journ. for March and August 1815, and June 1817; Dr. Gourlay's "Observations on Madeira," Lond. 1811; Dr. Clark's Influence of Climate, &c.—*Transl.*

ought probably to be able to correct an unknown alteration in the assimilation or nutrition, that is, an alteration in the state of the fluids of the body.*

LITERATURE OF PHTHISIS PULMONALIS.

1647. Garencieres (Theoph. de) Angliæ Flagellum seu Tabes Anglica. *Lond.* 4to.
1656. Bennet (Chr.) Theatrum Tabidorum sive Phthiseos Xenodochium. *Lond.* 8vo.
1666. Harvey (G.) Morbus Anglicus, or the Anatomy of Consumption. *Lond.* 8vo.

* The result of all our knowledge of the pathology of phthisis, and of all our experience in the treatment of it, leading to the conclusion, that it is incurable by art, after tubercles are once developed,—the only part of the subject that is really of any practical importance is, the plan to be adopted in individuals predisposed to the disease, with the view of obviating the formation of these extraneous bodies: and this is a part of the subject which our author has left untouched. Whatever be the proximate cause of tubercles, or whatever may be the precise condition of the whole system, or of the lungs, which, as applied to phthisis, we comprehend under the term *predisposition*, there seems every reason for concluding, not only from analogy, but experience, that it is a morbid condition, which is, in many cases, susceptible of being induced, aggravated, or removed. This conclusion seems borne out by the familiar facts—of all the children of a consumptive family dying of the disease, except perhaps one or two, while, in families not at all predisposed to phthisis, one child out of many shall be alone affected; and the conclusion is at once strengthened and rendered of infinitely more importance by this additional fact, also not very uncommon, of the children so dying, or so escaping, having been subjected to a peculiar mode of treatment. Many facts observed in veterinary medicine, add irresistible evidence to the truth of this conclusion. "It is certain, from the experiments of Dr. Jenner, that we can, by unsuitable food, soon call up a tuberculous disease in rabbits; and it is equally well known, that a wet season and bad pasture will bring into existence the same disease, to a much greater extent, in sheep and other animals. It is, besides, ascertained, that the disease in both cases may be got rid of (provided it be not permitted to advance too far) by a more wholesome diet, and judicious removal from the influence of the other predisposing causes."—Dr. Baron's "*Illustration of the Enquiry*," &c. p. 212. Although there can be little doubt that Dr. B. has, in this extract, mistaken vesicular worms, or hydatids, for tubercles; still the fact, though possessing the force of analogy only, is one of high value in the present inquiry. Indeed, all our facts and reasoning point not merely to the necessity of watching the very first and slightest symptoms of incipient consumption, but of subjecting every child which seems predisposed to it, whether from hereditary or acquired causes, to a most rigid system of prophylactic discipline. For some most valuable observations on this subject, I refer the reader to Dr. Baron's work, just quoted, and regret that my limits will only permit me to extract a single sentence. "Since it appears (says Dr. Baron) that whatever enfeebles the frame, or deteriorates the constitution, predisposes to the diseases in question, how shall we avert this predisposition? The answer is apparent: we must do every thing in our power to invigorate and fortify the frame; to bring all its functions into a healthy state; and by all means to endeavour to keep them so."—Op. Cit. p. 215. In these few words, we have unfolded the germ of a system of prophylactic treatment, which I have long advocated, and of the incalculable importance of which I have become every day more convinced, not merely by observation of its value, even when most imperfectly applied, but by the deep conviction, founded on no slight experience, that every measure hitherto proposed for the removal of tubercles in the lungs, after they are fully developed, is utterly valueless. While enforcing a system of invigoration in these cases, I must caution the young practitioner against the administration of stimulant food or medicine, when there exists any inflammatory complication, more especially of the stomach. When such a complication exists, I need hardly observe, that what are usually denominated tonics, will act as the most powerful debilitants, and that for the preservation or restoration of the strength, we must rely on abstinence and depletion. See p. 295. Here again I must refer the reader to Dr. Clark's invaluable treatise for the development of the principles and means of prophylaxis.

1667. Maynwaring (Ev.) A Treatise of Consumptions. *Lond.* 8vo.
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1778. Baumes (J. B. T.) Traité de la Phthisie pulmonaire. *Montpel.*—(*Par.* 1805.)
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particularly Scrofula, Consumption, &c. *Lond.* 8vo.
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of its Treatment. *Edin.*
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Diseases, the increase of Consumption, &c. *Lond.* 8vo.
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1809. Portal (Ant.) Observ. sur la Nature et le Traitement de la Phthisie. *Paris.*
1810. Bayle (G. L.) Recherches sur la Phthisie Pulmonaire. *Par.* 8vo.

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1818. Mansford (J. G.) An Inquiry into the Influence of situation on C. *Lond.* 8vo.
1820. Maygrièr. Dict. des Sc. Méd. (Art. *Phthisie Pulm.*) t. 42. *Par.*
1823. Engelhard (J. F.) Die Lungensucht in ihren verschiedenen formen und Zeitraumen. *Auran.* 8vo.
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1826. Andral. Dict. de Méd. (Art. *Phthisie.*) t. 16. *Par.*
1827. Hammersley (And., M.D.) A Diss. on the remote and proximate causes of Phthisis Pulmonalis. 2d. ed. *New York.* 12mo.
1830. Gannall (M.) Two memoirs on the inhalation of Chlorine in Consumption. Tr. by Potter. *Lond.* 8vo.
1830. Murray (J.) Treatise on Pulmonary Consumption. *Lond.* 8vo.
1832. Blackmore (E., M.D.) A Pract. Treat. on Pulm. Consumpt. *Lond.* 8vo.
1834. Clark (James, M. D.) Cycl. of Pract. Med. Vol. 4. Art. *Phthisis.*
1834. Ramadge (F., M.D.) Consumption Curable, &c. *Lond.* 8vo.

Transl.

CHAPTER VIII.

OF CYSTS FORMED IN THE LUNGS.

BY the term *cyst*, I understand, with most modern anatomists, an accidental membrane, forming a sort of shut sac, commonly of a roundish shape, but sometimes irregular and anfractuous, and containing a liquid or half liquid matter, secreted by the membrane which encloses it. There is, indeed, another variety of cysts, I mean those which contain matters of a more solid consistence, and of a kind not met with in the healthy body, such as the matter of tubercles, cancer, &c.; but I do not intend to give any account of them at present. Cysts of the first kind always consist of a substance analogous to some of the natural tissues of the body: most commonly they resemble, in every respect, the serous membranes, such as the pleura and peritoneum, as was remarked by Bichat; sometimes, however, they are more like the mucous tunics of the bladder or intestines. These cysts are frequently surrounded by a layer of a fibrous or condensed cellular substance, (of more or less thickness, and commonly incomplete,) by which they are connected with the neighbouring parts. Sometimes we meet with cysts composed of the two kinds of tissue just mentioned, with the addition, occasionally, of portions of cartilage and even laminæ of bone, of a greater or less extent. The inner surface of these compound cysts has scarcely ever the smooth and polished surface of the serous or mucous cysts, being uneven, rough, and frequently coated, in different points, by an albuminous or fibrous and half-concrete substance, constituting one body with the sac, and passing insensibly into it. Cysts are, of all the kinds of accidental productions, that which is most rarely met with in the human lungs. Morgagni gives only one instance of the sort. (*Epist.* lxix. 18.) They are, however, by no means rare in the lungs of animals, particularly bullocks and sheep; and they are usually of the serous kind, the sac being thin, and the contained liquor thin and very limpid. In the human subject, on the other hand, I have only met with the compound cysts above described, and this only three or four times. I am disposed to believe that these had formerly contained hydatids, (vesicular worms,) like those to be described in the next chapter. The largest of these cysts was situated in the inferior lobe of the lungs, and might have held an apple. It was of a very irregular shape; its walls varied in thickness from two to four lines, and were lined internally by an albuminous or fibrous substance of a yellowish white colour, quite soft in some points, and in appearance very like the middle coat of an artery. Towards its surface, this cyst had a perfectly fibrous appearance.

like tendon; and in different points it had the look and the consistence of cartilage. There were also several bony plates in it, some of which were parallel, and others quite perpendicular to the walls, and prolonged on either side, so as to project at once into the cavity of the cyst and into the pulmonary substance, with which latter they were firmly united by means of a thick layer of a fibrous substance. This sheath invested them while contained in the walls of the cyst, but left them to project quite naked into its interior, which contained a yellowish puriform fluid. It cannot be doubted, that a cyst of this size must have occasioned a diminution or total loss of the sound of respiration in the corresponding points of the chest.[*]

CHAPTER IX.

OF VESICULAR WORMS, OR HYDATIDS IN THE LUNGS.

THE only species of vesicular worms that I have met with in the lungs, belongs to the genus to which I have given the name of Acephalocyst.[†] These animals, formerly named *hydatids*, and long confounded with cysts, properly so called, have the form of simple vesicles of a spheroid or ovoid shape, very variable in size, soft, and of a degree of consistence and an appearance exactly like that of half-boiled white of egg. Their coats are diaphanous, or semi-transparent, colourless, or of a milky colour, varying sometimes towards reddish, yellowish, greenish, or greyish. Sometimes they are of unequal thickness; but frequently they are uniform in this respect. These vesicles contain more or less of a fluid which is commonly serous and limpid, sometimes turbid, and tinged of a yellowish or sanguine hue. Sometimes a large vesicle includes several smaller ones; at other times, still smaller ones are found adherent to the internal or external surface of their parent, from which they only appear to be separated when they have attained a certain size. Acephalocysts present no distinguishable organ, and offer the simplest example of an animal that can be imagined. This extreme simplicity of conformation has induced Rudolphi to call in question their animal character.* In this place I shall merely observe, that M. Percy has seen this species of hydatids move in a very distinct manner, and I have myself observed all the stages of their reproduction. This takes place, as in certain polypi, by a process somewhat like *budding*. Small buds form in the substance of the coats of the animalcule, which project, either exteriorly or interiorly, grow hollow, assume the rounded form as they enlarge, and finally detach themselves from their parent. Acephalocysts are always inclosed in a cyst, which completely separates them from the surrounding parts. These cysts are commonly of a fibrous nature, but frequently there are found in them portions of a cartilaginous or bony character. Their internal surface is rarely smooth: frequently it is so unequal as to have the appearance of being lacerated. Sometimes it is lined by an opaque albuminous matter, semi-concrete, and partially reduced to detritus, and of a yellow ochrey or tawny colour. When there are several hydatids in one cyst, this further contains a fluid in which they float, which is sometimes limpid, sometimes turbid, yellowish, or sanguinolent. When the cyst contains only one hydatid, this sometimes fills it completely, and lines, as it were, its internal parietes. This species of Acephalocysts may originate in almost every organ in the body. They have been often met with in the lungs: at least, all the cases of *hydatids* recorded as being found in this viscus, appear to me to belong to this species. The most remarkable are those published by Johnson,† Collet,‡ Maloët,§ Beaumes,‖ and Geoffroy.¶ I shall here give an abridgment of the case of M. Geoffroy, because, I think it must appear evident that, by means of the stethoscope, the progress of the disease might have been easily followed, and perhaps even a diagnosis sufficiently precise might have been attained to justify the puncture of the chest.**

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[*] For further details respecting the organic lesions described in this chapter, I refer the reader to Bichat's *Anatomie Generale*, par Beclard, Paris, 1821, t. i. p. 198, t. iv. p. 151. 158; Cruveilhier's *Anatomie Pathologique*; Abernethy's *Surgical Observations on Tumours*, p. 107; *Dict. de Medicine*, t. xii. p. 525. For some observations on the origin and mode of development of these cysts, I refer to an article by Louis in the *Encyclopédie Methodique*, to the work of Bichat just quoted, and to an article by Sir Astley Cooper in the second part of his and Mr. Travers's Essays, p. 222. For an account of the difference between *simple cysts* and *hydatid cysts*, see Beclard's additions to Bichat, t. iv. p. 460.—*Transl.*

[†] In the Memoirs of the Faculty of Medicine, printed in 1806, but not yet published. See an extract from this in the Bulletin of the Faculty, No. 10, 1804.

A young man had an attack of pneumonia when eighteen years of age, which was perfectly cured, and he remained well two years; he then caught a violent cold, which was attended by acute pain in the left side which prevented him lying on it. He never got well of this last symptom. He was afterwards attacked with jaundice which lasted three months, and he also passed some portions of tænia. The cough and pain of side returned after this, very violently, and, upon their cessation, he discovered a small movable tumour situate in the right hypochondre. This tumour increased and extended towards the umbilicus, being attended by cholic and head-ache. The pulsation of the heart was very strong in the epigastric region. The principal symptoms at the end of three years were constant dyspnœa, which increased to a feeling of suffocation on going up stairs; frequent faintings; occasional cough and spitting of blood, and constant tremblings. After a year and half, these symptoms increased, and the fits of suffocation became more violent. In one of these he suddenly expired. On examination after death, a large hydatid was found, partly contained in the liver, and partly projecting into the abdomen. Its coats were thin yet fibrous. It contained a fluid of a brown colour, and a great number of smaller hydatids; most of them of the size of peas; one or two as large as the yolk of an egg. The lower end of the sac adhered to the small curvature of the stomach. In the chest there was found on each side an enormous hydatid containing five pints of fluid. They adhered to the ribs and the mediastinum, and by their increase had compressed the lungs into a thin layer on the anterior part of the cavity. The heart was completely thrust out of the thorax into the epigastrium. Each hydatid was eleven inches long, and contained full five pints of a perfectly limpid fluid. It is difficult to learn, from the description of these hydatids, whether they originated in the substance of the lungs, or merely beneath the pleura pulmonalis or costalis. I think it, however, most probable, that they originated in the substance of the lungs. M. Cayol has since presented a case very similar to the above, which has not yet been made public. In the Journal de Méd. for 1801, there is the case of a man who expectorated for several months rounded pellicles which were evidently the remains of hydatids, and some seemed to be these merely flattened. I have myself seen two similar cases, both of which, as well as that recorded in the Journ. de Méd. were cured. On this account, the actual seat of these bodies could not be determined, but there can be little doubt of its having been the lungs. About fifteen years ago, a young woman consulted me on account of being affected with severe dyspnœa, cough, abundant expectoration and emaciation,—in short, all the ordinary symptoms of phthisis pulmonalis. One day, after acute pain of the epigastrium, she evacuated by stool a considerable quantity of hydatids, of a size from that of a filbert to that of a pigeon's egg. From this very day the hectic fever, the catarrhal symptoms, and dyspnœa ceased, and shortly after the patient regained her flesh and strength. May we believe in this case, that a cyst situated in the left lung made a passage into the stomach or colon through the diaphragm? Be this as it may, there can be no doubt, I think, that in all such cases the stethoscope would enable us to come to a much more accurate diagnosis than we could attain without it. The site of the disease and its extent, would, at least, be easily ascertained. In 1821, Dr. Beaugendre of Quimperle afforded me an opportunity of examining the chest of a woman, recovering from a pectoral affection, during the continuance of which she had expectorated a great number of acephalocysts. There still remained some cavernous rhonchus in the site of the cyst, and Dr. Beaugendre had several times heard, in the same place, a slight guggling independent of the respiratory movements, and which seemed owing to the automatic contraction of the hydatids.*

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* Entozoorum, sive Verm. Intest. Hist. Nat. Amstel. 1810, vol. ii. pars. ii. p. 36

† Philos. Trans. Abridg.

‡ Comment. de reb. in scient. nat. vol. [illegible]

§ Mem. de l'Acad. des Scienc. an. 1782.

‖ Annales de Montpel. tom. i

¶ Bulletin de l'Ecolé de Méd. an. 1805.

** Many cases of hydatids discharged by expectoration are on record, and still more in which they were found in the lungs after death. Of the former kind see a case by Dr. Collet in the *Med. Trans. of the Coll. of Phys.* vol. ii. p. 486; another in the *Lond. Med. Journ.* vol. vi. p. 293, 1785; and two others in Andral's *Clin. Méd.* t. iii. p. 393, in which place there are also four other interesting cases of pulmonary hydatids. For further accounts of *Hydatids*, see Dr. Hunter's paper in the *Med. and Chir. Trans.* vol. i. p. 34; Baillie's Morbid Anat. p. 237; and Parr's Med. Dict. vol. i. p. 765.—*Transl.*

Treatment.—The signs of a vast hydatid cyst seated near the surface of the lungs or beneath the costal pleura, being the same as those of empyema, would point out the propriety of the operation used in this disease; and perhaps such an operation might be more successful in the case of the hydatid than in that of the empyema. When the expectoration of hydatids or other signs point out their existence in the lungs, common salt would appear most deserving a trial as a means of cure. The *rot* and the *staggers* in sheep, are occasioned by the development of two species of vesicular worms (the *cysticercus lineatus* and *tenuicollis*, and the *cœnurus cerebralis*, of Rudolphi,) the one in the liver or some other of the abdominal viscera, and the other in the ventricles of the brain. The sheep which feed in salt meadows are exempt from this disorder, and a removal to such meadows most frequently cures those already affected with it. I have more than once employed salt water baths, with seeming success, in cases of individuals affected with a disease of this kind. It is not necessary that the hydatids should be expelled to effect a cure: it suffices that these are deprived of their vitality. In this case, the liquid which they contain, and also that in which they are contained, is absorbed; the cyst contracts into a very small compass; and upon cutting into the tumours, we find the hydatids quite flattened, closely pressed together, and sometimes stratified with layers of the albuminous and friable matter which I mentioned above in describing them.[*] In this state such tumours appear to exert no bad influence on the system; and, no doubt, cases of this kind have been mistaken for cancerous swellings, which, in rare instances, have got well beyond all expectation.

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* MM. Briançon and Piorry appear to have observed the same sounds in hydatid tumours of the abdomen, where, of course, there could be no mistake as to the respiratory murmur. Combined with this, there was found also, on percussion, a dull sound having something of an oscillatory character, and the two phenomena together, they conceived to be indicative of the presence of acephalocysts. (Piorry, *De la Percussion Méd.* p. 158.) Dr. Ambroise Laennec has also observed, in a case of abdominal tumour with all the characters of an ovarian dropsy, expansive and contractile motions bearing no relation to the beat of the pulse, and which was, probably, owing to the automatic movements of an acephalocyst. (*Rev. Méd.* Oct. 18[illegible].) These observations, however, although valuable in relation to the diagnosis of abdominal hydatids, are of no use in the case of pulmonary hydatids, the only certain sign of which is that supplied by the expectoration.—(*M. L.*)

CHAPTER X.

OF BODIES OF A CARTILAGINOUS, BONY, CALCULOUS AND CHALKY NATURE, FORMED IN THE LUNGS.

THESE various productions are frequently met with in the lungs, and they have, indeed, been noticed by almost every pathological anatomist since the sixteenth century. Besides the cartilaginous productions already described in former parts of this work, we sometimes find in the lungs cartilaginous cysts inclosing bony or chalky concretions, of the kind immediately to be described; and also cartilages of no regular shape or size, containing here and there points of incipient ossification. The bone which is formed in these cartilaginous bodies, or without their previous presence, in the substance of the lung, is never of a perfect kind; or, at least I have never met with any accidental production of this kind in the lungs which had either the fibrous texture or solidity of the middle of the long bones, or the spongy character of the ends of the same bones. It appears that, in their formation, a greater quantity of calcareous phosphate, and a much less proportion of gelatine is employed, than in true bone; hence these bodies resemble more a piece of stone than bone,—a character which accounts for the epithets *calculous* and *tophaceous* given to them by authors. In some cases they do not contain a particle of gelatine; and, in this case, the calcareous phosphate resembles moistened chalk. I shall notice these different varieties under the name of *imperfect ossifications*, and *chalky concretions*.

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[*] In a former note I had occasion to refer to the opinion of Dr. Baron respecting the supposed origin of pulmonary tubercles in hydatids, and to state my belief of the untenable grounds on which his opinion is founded. It seems probable, as stated by Dr. M. Laennec, that the mistake of Dr. B. may be attributed partly to his having mistaken for tubercles, examples of that degeneration of hydatids, described by our author in the text, as resulting from the death of these animals; and partly to his having overlooked the distinctive characters of the different species of hydatids described by naturalists, and thereby confounded the *cysticercus finna* of the hog (which is of a comparatively solid character, and has very rarely been met with in the human body, and never in the lungs,) with the simple acophalocyst. See the work of Rudolphi. See also a review of Dr. Baron's work, by Dr. Meriadec Laennec, in the *Revue Méd.* for April, 1825.—*Transl.*

The imperfect ossifications are encysted, or not encysted. The former are very rare in the lungs. They are of a rounded form, of a size from that of a hemp-seed to that of a hazle-nut, and are enclosed in a cartilaginous cyst, of half a line to a line in thickness, which adheres closely to them. The non-encysted ossifications are of a very irregular shape. Their surface is rugged and rough. Interiorly they are white, opaque, very similar to calculous productions, and readily reduced to powder by being bruised. On the other hand, their external parts are somewhat yellowish, slightly diaphanous, more difficultly pulverizable, and in short, in a more perfect state of ossification. These ossifications are found sometimes included in, and intimately adherent to, the pulmonary tissue; at other times they are observed in the centre of a cartilaginous production; and frequently in the body of a tubercle, especially those of the bronchial glands. In the latter case, when the tubercle softens, the bony concretion may be found loose in the cavity, or may be expectorated, if it is not of too great a size to pass through the bronchi. The chalky concretions are found in two states,—one resembling chalk slightly moistened, the other like chalk completely softened in water. In the last state they are always encysted; in the first they may, or may not be, although they most commonly are so. When crushed between the finger and thumb, they are sometimes reducible to an impalpable powder, but frequently they give the feeling as if grains of sand were intermixed with the soft chalk: these grains are small ossified points. The cysts enclosing these cretaceous productions are commonly cartilaginous. They are rounded, or without any regular figure. I have seen one in the form of a pyramid with four enequal sides. The rounded cysts are sometimes bony, but of an imperfect ossification, and resembling, in all respects, the semi-transparent external crust of the osseo-calcareous concretions described above. I have sometimes found concretions of this sort composed of several bony or cartilaginous cysts, one included within the other, and each separated by a layer of soft cretaceous matter. It is much more common to find this half-fluid chalky matter in the centre of a tubercle, particularly in the bronchial glands. In this case, although the matter is equally soft as the substance of the tubercle itself, still it is easily distinguished from it, by its greater opacity, and by its whiteness, which forms a considerable contrast with the pale yellow colour of the tuberculous matter. When allowed to dry, this cretaceous matter becomes white, and acquires a degree of cohesion which prevents it from being pulverized by the mere pressure of the finger. The bony or cretaceous concretions of the lungs are commonly very small; I have never seen them larger than an almond. Neither have I ever seen a complete conversion of a portion of lung into a substance of this sort, but sometimes I have observed the pulmonary tissue around an imperfect cicatrization, as if injected, or impregnated with a small quantity of disseminated chalky matter.

Very singular opinions as to the cause and origin of these calcareous productions are to be found in the writings of most pathologists. Cullen, with many others, regards them as a frequent cause of asthma, and thinks that they may be occasioned by the powdery substances diffused through the air breathed by different kinds of artisans—such, for instance, as starch-makers, lapidaries, lime-burners, &c. The chemical nature of the concretions, so much better known than formerly, renders this opinion quite untenable at the present day. I do not mean to deny that the habitual respiration of a powdery atmosphere may cause a temporary dyspnœa, and even be the source of a formal disease of the lungs; but as a proof that too much stress has been laid on this circumstance as a cause of pulmonary diseases, we have only to examine the expectoration of a person who has passed the night in an apartment the air of which has been rendered turbid by the smoke of a lamp, or of a carrier who has been all day on a road enveloped in clouds of dust:—in either case, we shall find that, in the course of four-and-twenty hours, the whole of the extraneous matter has been expelled along with the bronchial mucus.* Besides, if such substances could be retained in the lungs, they would be retained in the bronchi, and we should, in such a case, find there an accumulation of such matters, differing in their nature according to the particular kind of occupation of the individual. Now, I believe, nothing of this kind has ever been discovered on dissection; at least, I can assert that I have never met with any thing of the sort, though I have examined the lungs of a great number of persons who had passed their lives in workshops of which the atmosphere was constantly charged with calcareous or other kinds of dust. Furthermore, I do not intend denying that the existence of a great number of bony concretions in the lungs may be productive of habitual dyspnœa, more or less severe; but I can assert that I have met with such concretions, and in great quantity, in the lungs of persons who had never experienced any affection of the respiration; and I am convinced, as well by my own dissections, as by those given by other observers, that such concretions have never been found sufficiently voluminous, numerous, or congregated, to justify our attributing to them any case of dyspnœa so intense as to be reckoned by practitioners under the head of asthma. The opinions of M. Bayle respecting the effect of these concretions are very singular, quite unsupported by either reasoning or analogy, and, indeed, rather invalidated than confirmed by the facts he has himself adduced. He considers them as one cause of phthisis, and gives the following statement of the symptoms produced by them ; " The majority of subjects, (he says) affected with this disease, expectorate small calcareous fragments, of a greyish or whitish colour, often in great number, and they have a dry cough for a long period."[*] It is remarkable that M. Bayle mentions neither expectoration, dyspnœa, wasting, nor hectic fever, as symptoms of the complaint, and it is therefore singular how he has been led to reckon it as a species of consumption. The two examples adduced by him are very little to the purpose. The first (Case XXIII.) is the case of a man affected for nine months with a slimy expectoration, intermixed with puriform sputa, and occasionally with small chalky fragments. Hectic fever supervened and carried him off in six weeks. A great number of small cretaceous concretions, some soft, some hard, some encysted, some not encysted, were found in the lungs. The substance of the lungs was slightly indurated around these concretions, but, in other respects, healthy. In this instance it is evident that the consumption and death were produced by a chronic catarrh ; and I see no reason to attribute the result to the concretions, since we often find them equally numerous without any such consequence. The second example (Case XXXIV.) is that of a man who died of fever complicated by pleuro-pneumonia. He had experienced, for twelve months, dyspnœa, frequent cough, and consequent mucous expectoration, but very little emaciation. In this, as well as the former case, we find nothing characteristic of true consumption. In examining the cases of pulmonary concretions of this kind, contained in the writings of Morgagni, Bonetus, and various other authors, it is easy to perceive that, in most of them, the existence of these was productive of no severe symptom, and that even the dry cough, or cough with ropy expectoration,—symptoms, be it remembered, of very uncertain import,—was by no means a constant attendant on such a condition of parts. My own dissections afford a similar result. I have often found concretions of this kind in persons who had no disorder of the respiration. Others had a dry cough, or cough with expectoration of different kinds, and with or without dyspnœa ; but there was, in almost all these, some other morbid alteration of the pulmonary tissue, to which the symptoms might be attributed with as much justice as to the concretions, or more so. In particular, it is very common to find co-existing with these concretions, traces of cicatrizations in the lungs, of the kind described in a former chapter ; and, at the same time, to observe the pulmonary tissue flaccid, hard, and impregnated with a great quantity of black pulmonary matter around the concretions, and the interstices that separate them from the cellular, fibrous, or cartilaginous cicatrices alluded to. From these facts I am led to believe, that, in most cases, these concretions are consequent to tuberculous affections that have been cured, and are the product of the curative efforts of nature, which appear to have elaborated a superabundance of the calcareous phosphate: this seems necessary to the formation of the cartilaginous bodies which constitute, for the most part, the fistulæ and cicatrices found in such cases in the lungs. Several of the cases related (XIX. and XXII.) countenance this opinion, and others to the same purport will be given afterwards. I by no means, however, wish to assert that concretions of this kind may not take place in the lungs primarily, and independently of the previous existence of tubercles; but I look upon such cases as very rare; and, when they do occur, I am assured that they give rise to little or no disorder of the system.

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* It is hardly necessary to observe, that the argument in the text, however good against the origin of earthy concretions in the lungs, is altogether invalid as regards the production of other diseases of the pulmonary or bronchial systems. Indeed, as was stated in a former note, no fact is better established than the power of a powdery atmosphere to cause, directly, pulmonary disease.—*Transl.*

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[*] Recherches sur la Phthisie, p. 34.

The bony and chalky concretions of the lungs being always of small size, their existence can never be ascertained nor even suspected by the aid of the stethoscope, unless they are situated in a part of the lungs rendered impermeable to air from the cicatrization of tuberculous excavation.[*]

CHAPTER XI.

OF MELANOSIS OF THE LUNGS.

The older surgeons, and after them, the modern anatomists, have confounded under the name of *Scirrhus*, *Cancer*, or *Carcinoma*, different morbid growths which have no common character but that of their being unlike any of the natural or healthy tissues of the body,—their originating in an indurated state,—and their subsequent softening and self-destruction.[†] This confusion has proved a great bar to the progress of morbid anatomy. Convinced of this, I have paid particular attention to the discrimination of these various productions, and have succeeded in pointing out several very distinct species. That which I have now to notice, and which I described many years ago, (1806,) in an unpublished memoir presented to the Faculté de Medicine, is the most easily recognized in all the organs except the lungs, in which, owing to its colour, it is sometimes distinguished with much difficulty, from the black pulmonary matter.

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[*] These bony concretions generally consist of a large proportion of phosphate of lime, a small proportion of carbonate, and animal matter. See Thomson's Chemistry, 5th edit. vol. iv. p. 572. See also Dr. Prout's Analysis, Lond. Med. Repos. vol. xii. p. 352.—*Transl.*

[†] See Dict. des Sc. Méd. *Art.* Anat. Pathol.; also Journ. de Méd. t. ix. for Jan. 1805.—*Author.*

In their early or *crude* state, these productions possess a consistence equal to that of the lymphatic glands, and a homogeneous and somewhat humid composition; they are opaque, and, in structure, very much resemble the bronchial glands in the adult. When they begin to soften, a minute portion of fluid can be expressed from them, of a thin reddish character, intermixed with small blackish portions of a substance which is sometimes firm, sometimes friable, but which, even when friable, conveys to the touch an impression of flaccidity: in a more advanced stage, these portions first, and subsequently the whole mass in which they are contained, become quite friable, and are soon converted into a black paste.*

Melanosis may exist in four different forms, viz: 1. encysted; 2. non-encysted; 3. impregnating or infiltrated into the natural substance of an organ; and 4. deposited on the surface of an organ.

1. *Encysted melanosis.*—The cysts enclosing this species are very regularly rounded, and vary in size from that of a small hazel-nut to that of a walnut. At least, I have never met with any that did not come within these dimensions. They have a very regular and equal thickness, which is never greater than half a line. Cellular substance appears to be the only tissue that enters into their composition. They adhere, by means of a very fine cellular tissue, to the substance of the organ in which they are situated, and from which they can be readily separated by dissection. Their interior surface is rather smooth, but adheres to the morbid matter which it surrounds. The medium of this adhesion appears to me to be a very fine imperfect cellular tissue, though it cannot always be distinguished. I have hitherto only

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* Laennec's view of the formation and progress of melanosis is now very generally abandoned by pathologists. The following extracts from the work of Dr. Carswell, the highest authority on this subject, gives, I believe, an accurate representation of the facts:—"Only two changes are observed to take place in the melanotic matter after its deposition. The first consists in the inspissation or solidification, the second in the softening or liquefaction of the melanotic matter . . . . . The material of which melanosis is composed exists primarily in a fluid form, and every increase of consistence which it afterwards acquires, is owing, chiefly, either to its combination with the molecular structure, or the dense unyielding nature of the tissues or organs in which it is deposited . . . . . . It follows as a consequence, that the process of softening cannot take place until that of solidification has been, at least, carried to a certain extent: perhaps it never does take place until it has been carried to its maximum; for the softening of the melanotic deposit is observed only when it has acquired the form of a tumour, or occupies an irregular portion of an organ. Under these circumstances, the softening of the hardened melanotic mass is effected in the two following ways: first, by the destruction of tissues included within it and around it; second, by the effusion of serosity caused by its stimulating power as a foreign body. The liver and lungs furnish the best examples of softening of melanotic tumours from destruction of the tissues in which they are formed." (*Cyc. of Pract. Med.* vol. iii. p. 95.)—*Transl.*

found this variety of melanosis in the liver and lungs; and, in the latter organ, I have only as yet met with a single mass of it.

2. *Unencysted melanosis.*—This variety is much less rare than the preceding: I have met with it in the lungs, the liver, pituitary gland, and the nerves; but it has been since found in almost every organ. The volume of masses of this kind is quite indeterminate,—varying from that of a millet-seed to that of an egg, or more. They are also quite irregular in figure. They commonly adhere very closely to the parts in which they are situated; sometimes, however, they are united to these by a very fine, though sufficiently visible, cellular tissue, which permits their removal without any laceration. In this last case they are commonly of a rounded shape.

3. *Impregnation of the natural tissue with the matter of melanosis.*—It frequently happens that this morbid matter, in place of being segregated in distinct masses, is disseminated throughout the organs in which it is found, and deposited between the particles or molecules of the natural tissue. The appearances and colour of parts affected in this manner, present a good many varieties, according to the texture of the organ, the quantity of morbid matter deposited, and the particular condition of this matter. When the infiltration is recent, and in moderate quantity, the appearance of the affected part merely differs from the natural condition in being intermixed with small black dots or striæ, the intermediate portions being quite of a healthy character. As the disease increases, the dots and striæ enlarge in number and volume, until the whole of the natural tissue of the part is lost in the morbid degeneration. It is usually only at this period of its progress that the melanose matter begins to soften; but if the softening takes place before the complete removal of the natural tissue of the part, it frequently happens that *this* softens also, and intermingles with the morbid matter, the colour of which is thereby changed to brownish, yellowish, or greyish.[*]

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[*] Laennec has omitted to notice here the fourth variety of melanosis, that, namely, deposited on the surface of organs; probably because he treats of it in the chapter on the accidental productions of the pleura. MM. Breschet and Andral recognize still another form of melanosis, viz. one primarily fluid. Andral (*Précis. d'Anat. Path.* t. i. p. 456) adduces as example of this: 1. certain cases of chronic peritonitis in which the peritoneum contained a very black fluid; 2. a case of black urine observed by Proust, and in which this learned chemist conceives that he discovered a new acid termed by him *melanic acid*; 3. a case of fibrous cyst containing a black fluid, found in a horse by MM. Trousseaux and Leblanc; and 4. those cases of black or chocolate-coloured vomitings so common in cancer of the stomach.—(*M. L.*)

The omission by Laennec of all distinct notice of *liquid* melanosis (with which he was well acquainted, and which is, in fact, the same as his 4th form) is well accounted for by Dr. Carswell:—" It is (he says) obviously to be referred to a fundamental error in the pathological doctrines which he maintained, regarding the mode of formation, development, and termination of accidental or new products; for he believed that all these products possessed at first a greater or less degree of density, to which state he gave the name of *crudity*; and that they afterwards undergo, at some period or other of their existence, by means of some change taking place within

Melanosis, like all the other accidental productions which differ from the natural tissues of the animal economy, gives rise to constitutional and local disorder. Among the constitutional or general effects, the most constant are, the gradual diminution of the vital powers, and a marked change in the process of nutrition, whence result emaciation to a considerable degree, and dropsy of the cellular membrane, and, sometimes, of the serous membranes. The subjects whom I have known to die in consequence of melanosis in any organ, had no continuous or well-marked fever; and this is true of cases wherein the disease extended to a great portion of the lungs, and is also observable in the two cases (XX. and XXI.) of the same affection given in the work of M. Bayle. If this circumstance holds good generally, as I am much disposed to believe, it will assist in enabling us to distinguish, during life, consumption produced by melanosis of the lungs, from that depending on tubercles; which last, as is well known, is accompanied, through almost its whole course, by a hectic fever, which is usually characterised by two exacerbations,—one towards mid-day, and the other in the night. The most constant of the local effects produced by melanosis of the lungs, are dyspnœa, proportioned to the extent of the disease, and cough, which is often dry, but sometimes attended by a mucous expectoration intermixed with some puriform sputa. The melanose masses in the lungs may be sometimes completely softened, so as to leave, after their evacuation into the bronchi, cavities, resembling those produced by the softening down of tubercles. I have myself never met with excavations of this sort in the lungs; I have met with them, however, in the liver; and the work of M. Bayle contains two cases (XX. and XXI.) which incontestably prove the possibility of their formation in the lungs. In these cases the pulmonary tissue, so much impregnated with melanose matter as to be as firm as liver, (or even firmer,) contained a multitude of small excavations evidently formed by the partial softening of the same matter. It is clear that in cases of this kind, pectoriloquy would be found wherever such excavations came to communicate with the bronchi.* It is

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themselves, a process of solution, which he describes as the period or state of softening. The idea, therefore, of melanosis existing *primarily* in a *fluid* form, was repugnant to such doctrines; consequently this form of the disease could not be admitted by him into the class of accidental tissues, to which he conceived melanosis to belong." (*Cyc. of Prac. Med.* vol. iii. p. 85.)—*Transl.*

* M. Bayle's cases, as has been justly remarked by Andral, (*Dict. de Méd.* t. xiv. Art. *Melanose*,) by no means prove that the pulmonary cavities mentioned in them were the consequence of softening of the melanotic masses. There had been, during life, no black expectoration; no black matter was found in the bronchi after death, nor yet in the cavities themselves, which were, on the contrary, lined by a membrane covered with *white* pus. It is, therefore, more than probable that the excavations were of a tuberculous character, and were surrounded by a tissue impregnated with melanotic matter. Moreover, Andral regards as extremely rare the softening of melanotic matter, and even seems disposed to reject it altogether. (Le-

equally evident that the stethoscope would enable us to ascertain the impermeability of the lungs, in the cases in which the matter of melanosis was diffused through the substance of these organs; but could not enable us to distinguish it from chronic pneumonia.

Melanosis is one of the rarest species of cancer, and is very seldom met with in the lungs. This may seem an extraordinary assertion after the contrary assertion of M. Bayle, and the cases given in his work under the name of *Phthisis with Melanosis.* Whatever distrust I may have of my own opinions when they differ from those of that excellent observer, with whose extreme correctness I had better opportunities of being acquainted than any other person,—I, nevertheless, cannot help being of opinion, that he was deceived on this particular point, and that he sometimes confounded with melanosis the natural black pulmonary matter. I admit that these two substances are very much alike in their external characters, and I am not sure that the most experienced observer could discover any difference between a melanose mass in the liver or any other organ, and a bronchial gland of a perfectly black colour, such as they are often found in very sound lungs. I will not say that the following characters suffice to distinguish the two substances, but they may, at least, assist us in discriminating them:—The matter of melanosis, when softened, and even that which can be expressed from it while yet solid, dyes the skin black; but this colour is not very permanent, and can be easily removed by washing; while the blackness produced by the matter of the bronchial glands, if this be left to dry before washing, will remain on the skin for several days. The chemical composition of the two bodies also differs very considerably. The bronchial glands, according to Fourcroy, contain a large portion of carbon and hydrogen, while the matter of melanosis contains neither of these, but is almost entirely composed of albumen and a peculiar colouring matter.[*]

Cit. & *Précis. d'Anat. Path.* t. i. p. 450.) According to him, the softening, in certain cases, is dependent on that of the natural or accidental tissues with which the melanotic matter was united; while, in others, the supposed softening was merely the existence of melanosis, deposited in a liquid form, in substance or on the surface of other tissues.—(*M. L.*)

[*] MM. Lassaigne and Foy have analysed the matter of melanosis. The former detected in it fibrine, a peculiar black colouring matter, a little albumen, and various salts, among which were the phosphate of lime and the oxide of iron; the second found *much* albumen, a small quantity of fibrine, a very large proportion of a principle eminently carbonized—apparently a modification of the cruor of the blood; and, lastly, the various salts including the two mentioned in the analysis of M. Lassaigne. It is evident from these analyses that the constituent principles of melanosis are nearly the same as those of the blood, there being merely a predominance of carbon, and, consequently, that there is no essential chemical difference, as Laennec supposed, between the matter of melanosis and that of the black bronchial glands. —(*M. L.*)

The following are the particulars of the analysis by M. Foy, of the melanotic tumour of the horse:—

Notwithstanding its resemblance to a black bronchial gland, melanosis is evidently a morbid and very deleterious production, inasmuch as it produces all the local and general effects of other cancers, when it exists in a certain extent; and since it is found united with other morbid productions in compound cancerous tumours. When melanosis forms masses of considerable extent, or when it impregnates the pulmonary tissue so thoroughly as to give it a deep black colour, and a consistence equal to that of liver, it is easily recognized; but when the impregnation is recent, and not sufficiently abundant to produce any considerable induration of the lung, it can, with difficulty, be distinguished from the black pulmonary matter.*

I have already mentioned this *black pulmonary matter* several times. It has been little noticed by anatomists; yet it exists so commonly in the lungs, and even in persons in the most perfect health, that we can hardly consider it as a morbid production. It is found more or less abundant in the lungs of almost every adult, and seems to increase with the age of the individual.

Albumen	15,00	Muriate of Potass	[illegible]
Febrine	6,25	Ditto Soda	[illegible]
Carbonized Principle	31,40	Carbonate of Soda	[illegible]
Water	18,75	Ditto Lime	[illegible]
Oxide of Iron	1,75	Ditto Magnesia	[illegible]
Sub-phosphate of Lime	8,75	Tartrate of Potass	[illegible]

Dr. Henry, of Manchester, has also given an elaborate analysis of the matter of melanosis, and with results nearly similar.—See *Fawdington on Melanosis.*—*Transl.*

* The efforts of Laennec to establish a distinction between the matter of melanosis and the black pulmonary matter, have been generally regarded as futile; and most of the anatomists of the present day consider melanosis not as an *accidental production*, in the sense in which this word is used by Laennec, but merely an impregnation of a tissue, whether normal or morbid, with a black matter of a peculiar kind. The only difference recognized between the two affections, is, that, in the one case, the colouring matter impregnates a healthy tissue, while in the other (melanosis) it impregnates an accidental or morbid tissue; the alleged *softening* of melanosis being merely the softening of the tissue wherewith the colouring matter is combined. But what is the nature of this black matter? Is it merely altered blood, as M. Broussais supposes, and as the chemical analysis tends to prove, or is it a peculiar morbid product, as M. Andral supposes? It is probably produced in both ways.—(*M. L.*)

Dr. Carswell agrees with those who regard the matter of melanosis as essentially composed of the colouring material of the blood, and states, that it is formed in the *blood* in the first instance, and afterwards deposited by secretion in the various parts where it is found. "It is not only (says Dr. C.) because this material is seen in the blood that we have fixed its *seat* in this fluid, but because our anatomical researches show that it is there formed." "The much greater frequency of melanosis in the grey and white than in the bay, brown, or black horse, (continues Dr. C.) is a circumstance of some importance, and which may be regarded as favourable to the theory which ascribes the origin of melanosis to the accumulation in the blood of the carbon which is naturally employed to colour different parts of the body, and more particularly the hair. This theory we are disposed to adopt, not only as regards the formation of the disease under these circumstances of colour, but also when it occurs in animals of a dark colour, and in man indiscriminately, whatever may be the peculiar tint of the skin or colour of the hair. In the first instance, the colouring matter formed is not deposited in the regular physiological order; in the second it is formed in too great quantity. In both cases, its presence and accumulation in the blood is accounted for."—*Cyc. of Pract. Med.* vol. iii. p. 95.—*Transl.*

In early infancy, we perceive no trace of it, and the lungs are of as pure a rose colour as those of the ox and several other animals. Perhaps this peculiar matter exists only in man, and the carnivorous animals; but I have been too little practised in comparative anatomy to advance any thing positive on the subject. I have sometimes imagined that this matter may arise, at least in part, from the smoke of lamps or other bodies in combustion, since we find some old subjects (and I have thought these were most commonly country people least accustomed to the use of artificial lights) in whom it exists in very small quantity both in the lungs and bronchial glands. I must admit, however, that I have seen the same slight degree of colouring in individuals who had been much exposed to this cause; as in one of the cases detailed at the close of this chapter. When it exists only in small quantity, it merely gives to the lungs a slight grey tint. On the surface it appears in small disseminated black dots, which are more numerous and thicker along the intersecting lines of the cells, so as to form striæ, small spots, or punctuated lines. These spots, still further crowded in different places, as well in the interior as on the surface of the lungs, form spots still larger and more numerous, so as sometimes to give a black colour to large portions of these organs. In no case, however, does this matter affect the suppleness or permeability of the lung, a circumstance which forms a striking contrast with the melanose infiltration. It is particularly in the bronchial glands that this black matter is found most abundantly. In adults, and espepecially in old persons, they are often found completely black; in others they are only partially stained, as if touched by a pencil. A condition of parts so common cannot be regarded as capable of producing disease, especially as it is often unattended by any symptom whatever of disorder. This matter in the bronchial glands would appear to be the cause of the grey colour of the bronchial mucus, which many healthy persons expectorate, and of the small black specks found frequently intermixed with that transparent secretion. This character of the bronchial mucus establishes another distinction between the black pulmonary matter and the matter of melanosis, as the existence of the latter, even in the greatest degree, never gives rise to an expectoration of a black colour, unless, perhaps, at the very moment of the escape of the softened melanose mass into the bronchi.*

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* In the Philosophical Transactions for 1813, Dr. Pearson has given an account and a chemical analysis of the black pulmonary matter as existing in the bronchial glands. I give the result of Dr. P.'s examination in the words of Dr. Young:— "He (Dr. Pearson) considers the bronchial bodies as true lymphatic glands, and thinks the black substance which often tinges them, consists of charcoal, derived from small particles of dust floating in the atmosphere, which have been taken in by the absorbents, and deposited in their glands: and he has found some of the lym-

The formation of tubercles in the lungs, and, more especially, the cicatrization of the tuberculous excavations, frequently produces, as I have previously observed, a more abundant secretion of the black pulmonary matter. In some cases, this abundance is such, as,—in conjunction with the compression of the pulmonary tissue produced by the tubercles, the cartilaginous cicatrices and the chalky matter that accompanies them,—to render the affected part considerably indurated, flaccid, and more or less impermeable to air. In extreme cases of this kind, it is difficult to say whether the colour and density of the affected part are the consequence of black pulmonary matter, or of melanosis. The rule of distinction we ought to follow in such cases is the following:—We ought not to admit the existence of melanosis, unless we find some of it in portions of some extent, and already softened, or, at least, so deposited and shaped, as to distinguish it from bronchial glands. We ought not to admit the existence of the infiltration of this matter, unless it has produced in the lungs a degree of induration equal to that of liver: and when this degree of hardness can be traced to the presence of bony or cartilaginous bodies, we ought to consider the black colour as derived from the black pulmonary matter. To render this distinction more easy, I shall here detail two cases. The first is an instance of melanosis occurring in the lungs, and in several other parts of the body. I prefer it, because it exhibits the disease in a great degree of development, and because it was drawn up neither by myself nor by my direction; it is extracted from the register of cases by the hospital pupils for 1816, preserved in the office of the board of administration. The second case offers an example of the difficulty of distinguishing the black pulmonary matter from the matter of melanosis.*

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phatics occasionally filled with a similar substance. He supports his opinion by chemical experiments, which show the insolubility of the black substance in nitric acid, while he has been unable to find any other animal substance, the ink of the cuttle-fish not excepted, that resists the action of the acid. The glands of the mesentery, he says, are also sometimes black, but their blackness disappears upon immersion in the nitric or muriatic acid."—*Young on Consumption*, p. 468.

Likewise Dr. Christison (Edin. Med. Journ., vol. 36, p. 393) has recorded an analysis of the black matter (evidently derived from an external source) found universally discolouring the lungs, in the very interesting case by Dr. J. C. Gregory. This analysis coincides, in the main, with that of Dr. Pearson.—*Transl.*

* For a complete view of all that is known respecting melanosis, and certain other affections which have been confounded with it, the reader is referred to the Fourth Fasciculus of Dr. Carswell's invaluable work on pathological anatomy, and to the article *Melanosis*, by the same author, in the third volume of the Cyclopædia of Practical Medicine. Dr. Carswell adopts the generic term *Melanoma*, as including "all melanotic formations, black discolorations, or products described by Laennec and other authors," but separates them into two great groups, terming the one *true melanosis*, the other *spurious melanosis*. Under the first head he comprehends all the black formations which depend on a modification of the secretory process, which gives rise to the natural colour of certain parts of the body, that is, all such products as can be regarded as constituting an *idiopathic* disease: under the second, he ranges all those which originate in the accumulation of a carbonaceous substance

Case XXXI. *Melanosis developed in a great number of organs.*—A woman, aged fifty-nine, entered the Hospital Saint Louis in August 1816, for an affection of two months' standing, which had arisen after violent grief. The disease commenced with great prostration of strength, loss of appetite and sleep. These symptoms were followed by vomiting and diarrhœa, and the development of small tumours, of a black colour, in different parts of the skin. When she came into the hospital, a great number of these tumours, of the form and colour of black currant seed, occupied the anterior part of the thorax. The spaces between some of these were filled with small spots very like flea-bites. The tumours were so close on the breasts as to form a large plate or crust. Some of the same sort existed in the abdomen, the largest being two inches in circumference. The arms and thighs, especially on their inside, were marked in a similar manner; the fore arms and legs were without any. In addition to the symptoms already mentioned, the respiration was difficult, there was frequent cough, and the pulse was extremely quick. These symptoms gradually increasing in degree, and being followed by œdema, the patient shortly after died.

Dissection.—The cutaneous tumours were found to consist of a homogeneous substance, of a more or less deep black colour, and of a consistence in some cases very considerable, in others merely pulpy. These tumours had all cysts of cellular substance, and appeared to be evidently of the kind already described as *melanosis*. They were found in almost the whole of the subcutaneous cellular tissue; also in the same tissue which incloses the vessels, nerves, and the lymphatic glands. In some places they formed, by their aggregation, masses as large as the fist. The nerves in their vicinity were sound, but the blood-vessels could not be separated from them without rupture. These tumours were found in the thyroid gland; also, in small quantity, in the lungs. In the neighbourhood of the bronchial glands they were numerous and larger, but the bronchial glands themselves were not black. They were seen in the substance of the mediastinum, and under the pleura; also, in great numbers, in the mesentery and omentum. All the abdominal viscera, except the liver, were sound, but the cellular substance around them contained similar tumours. The heart and brain were sound.

Case XXX. *Imperfect cicatrices in the lungs, intermixed with cartilaginous and chalky productions, and a great accumulation of black pulmonary matter.*—A man, sixty years of

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introduced into the body from without, in the action of chemical agents on the blood, or in the stagnation of the blood within the body. Dr. Carswell's essay, in his *Pathological Anatomy*, is illustrated by admirable representations of the disease, not only as occurring in the lungs, but in most of the other organs of the body. For further references to the published accounts of melanosis, see the bibliographical notice at the end of the present chapter.—*Transl.*

age, came into the Necker Hospital in October, 1817, in a state of marked cachexy. He had a slight cough, with expectoration of a grey, semi-transparent, and somewhat ropy fluid, which led to the suspicion of tubercles. He continued in the same state until the end of January following, when the cough became somewhat worse. At this time the chest, on percussion, seemed not to sound very well on the upper part of the left side before, and the respiration was less distinct in the same point. These results seemed to confirm the preconceived idea of incipient tubercles, and this diagnostic was accordingly made in the case-book. In the end of March, the chest was found to yield a good sound throughout. He died on the 13th of April.

Dissection.—The right lung was attached to the costal pleura at its summit by means of a firm cellular band, which sprung from a depression in the lung, irregularly marked by furrows uniting in a central point, and having every appearance of cicatrices. Beneath this depression, in the substance of the lung, a solid tumour was felt, of the size of a pigeon's egg, which, on incision, was found to consist of a grey semi-transparent substance, of the consistence and texture of cartilage, intermixed with small portions of the natural tissue of the lung, only very black and flabby. There were also found in it small cavities filled with a soft chalky matter. The whole lobe was one quarter smaller than natural, and almost entirely of a dark hue, varying, in different points, from a slate colour to that of the blackest ink. In the interstices of the cartilaginous bands, there were several small cavities, quite empty, and of the size of a hemp-seed. Several bronchial tubes, much dilated, terminated in this indurated mass. One of these, as large as a goose-quill before entering the tumour, was contracted immediately within it to the size of a crow-quill, and finally terminated abruptly in the centre of the mass without giving off any other branch. The middle and inferior lobes were pretty sound, but contained a few miliary tubercles. The upper lobe on the left side presented the same appearances as the right, only in a still more marked degree. In this the depression was several lines deep, and an inch square, and was partly covered by the overlapping of the adjoining portion of sound lung. A cellular band from the centre of this depression united the lobe to the costal pleura. The whole summit of this lobe, as low as the third rib, was indurated and variegated precisely as that on the other side. There were adhesions between the heart and pericardium, and the ventricles were enlarged. The abdomen contained a large quantity of a yellowish limpid fluid. The whole peritoneum was of a dirty grey colour, and studded with innumerable small, red, grey, or black points. The red points, united in flakes, had all the marks of being the result of an ancient inflammation. The others seemed to be tubercles in the first stage, grey and semi-transparent; they formed small tumours on the surface of the membrane, and some of them were of the size of large hemp-seeds. Those which were of a black colour and opaque, were evidently formed of the matter of melanosis. These two species of tubercles were most numerous on the intestinal portion of the peritoneum; the red spots or flakes were, on the other hand, most plentiful on the mesentery and omentum. This last was rolled together, so as to form a sort of hard and irregular tumour in the left hypochondrium. The peritoneum seemed much thicker and much softer than natural; but this arose from its being covered throughout, between the granulations above mentioned, with a thin and soft coating or layer of albumen.

In the first of these cases, there can be no doubt of the nature of the black tumours found in the lungs. The co-existence of similar tumours in divers other parts of the body, and the absence of the black colour in the bronchial glands themselves, leave no doubt on the subject. In the second case, the question as to the nature of the black matter in the indurated portions of the lungs, is much more difficult. The fact of the existence of bodies answering to the character already assigned to pulmonary cicatrices, and also of bony and cretaceous tumours, and, further, the immature tubercles in other parts of the lungs, as well as on the surface of the peritoneum,—all tend to support the opinion of the black colour being produced merely by the black pulmonary matter. On the other hand, the existence of some melanose tumours on the peritoneum give some colour to the suspicion, of the black portion of the lungs having derived their origin from the same source. The arguments, however, are decidedly in favour of the former opinion.

I have already observed, that M. Bayle appears to have sometimes confounded the matter of melanosis with the common black pulmonary matter. I think he has been equally wrong in classing melanosis of the lungs as a species of phthisis. In fact, the melanose affection, in place of producing progressive emaciation and hectic fever, the most constant symptoms of tuberculous phthisis, rather tends to produce cachexy and anasarca, and usually proves fatal before the supervention of any marked degree of emaciation. If we were to class diseases from so feeble analogies, we ought to range among consumptions, chronic pleurisy, pneumony, and catarrh, as well as several affections of the heart, or, indeed, every disease attended by dyspnœa and emaciation.

In medical writings we find but few cases which can be referred to this disease, melanosis; a circumstance which, no doubt, proves its extreme rarity; since its characters, especially when occurring in any other organ besides the lungs, are so well marked, as hardly to be mistaken. Haller relates (Opus. Pathol.) some of the best marked instances of it. "I have observed," he says, "a horrible age, came into the Necker Hospital in October, 1817, in a state of marked cachexy. He had a slight cough, with expectoration of a grey, semi-transparent, and somewhat ropy fluid, which led to the suspicion of tubercles. He continued in the same state until the end of January following, when the cough became somewhat worse. At this time the chest, on percussion, seemed not to sound very well on the upper part of the left side before, and the respiration was less distinct in the same point. These results seemed to confirm the preconceived idea of incipient tubercles, and this diagnostic was accordingly made in the case-book. In the end of March, the chest was found to yield a good sound throughout. He died on the 13th of April.

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Such are the characters which this species of cancer presents in its two latter stages, and equally in all the three varieties. I shall now describe the characters of each of these varieties in the first, or crude state.

1. *Encysted medullary tumour.* The size of this species is very various: I have seen the tumours as small as a hazel-nut, and larger than a middle-sized apple: I have found them as large as this in the lungs. The cysts are of pretty equable thickness; and this is never more than half a line; they are of a greyish-white, silvery, or milky colour, and have a semi-transparency, more or less, according to their thickness. Their texture is altogether cartilaginous and rarely fibrous; but it is much softer, and less easily broken by bending, than cartilage: on this account they must be ranged among the *imperfect cartilages*. The medullary matter contained in these cysts can be easily detached from their inner coat. It is commonly divided into several lobes

by a very fine cellular tissue, which may be compared with the pia mater; and it resembles this the more owing to the great number of blood-vessels which traverse it. The fineness and brittleness of these has been already noticed, and also their penetration of the cerebriform matter itself, to which they give a rose tint, here and there. It is their rupture that gives rise to the clots of blood formerly mentioned. Sometimes, also, the trunks of these vessels are ruptured in the interstices of the lobules; and the blood being injected beneath the fine cellular substance, which accompanies them, gives this the appearance of a distinct membrane. It is commonly in their early or crude stage that these tumours are divided into distinct lobes. These are especially observable on their surfaces, and have sometimes considerable resemblance to the convolutions of the brain. The cyst does not at all enter between these convolutions, nor does it even indicate on its surface their place or configuration. In this stage the cerebriform matter is pretty firm, often firmer than the fat of bacon. It is of a dull white, pearl-grey, or even yellowish colour, and, in thin slices, has a slight degree of semi-transparency. When cut into, it appears subdivided interiorly into lobules much smaller than those seen on its surface. These lobules are in such close contact as to leave no interval whatever; and their separation is merely indicated by the reddish lines traced by the vascular cellular tissue by which the separation is effected. These lines rarely cross each other, but exhibit many irregular curves and convolutions. When the tumours pass into the second stage, their texture becomes more homogeneous, and all distinction of the small interior lobules is quite lost; the distinction, however, of the larger exterior lobes still continues. The blood-vessels which run between these lobes, and in the cellular tissue immediately investing the tumour, are much more developed than in the early stages of the disease, and it is only at this second stage, or as it approaches the third, that the extravasations of blood take place. The third stage begins, as I have already mentioned, when the medullary matter has acquired a consistence like pap or paste, or like that of a brain softened by commencing putrefaction. In this state it has still much resemblance to cerebral substance. I have never found that this morbid growth softens still more, or that it is absorbed or evacuated, so as to leave an empty cyst or cavity like tubercles: consequently it is not probable that we shall ever find pectoriloquy as a sign of this affection. Hitherto I have only found these encysted medullary tumours in the lungs, liver, and cellular substance of the mediastinum.

2. *Unencysted medullary tumour.*—Medullary tumours of this species are very frequently met with. Their size is very variable; I have seen them from the size of the head of a full grown fœtus to that of a hemp-seed. Their shape is commonly

spheroid, but occasionally flattened, ovoid, or altogether irregular. Their external surface is lobulated, but the divisions are less regular than in the encysted species; their internal structure, in the two last stages, is precisely the same. The cellular membrane which invests them, is more or less marked, according as they are placed in a loose cellular tissue, or in the substance of a viscus of firm texture; in the latter case, their investing membrane is thinner and less distinct. In their first or crude stage, their semi-transparency is greater than afterwards; they are almost colourless, or have a very slight bluish tint in occasional patches: they are pretty hard, and divided into numerous lobes. Their substance is then fatty, like lard; but when incised it does not at all grease the scalpel, and heat coagulates it without showing a particle of fat. The transition from the first to the second stage takes place in the following manner:—the substance of the tumour becomes more opaque, softer, whiter, and its inner distinction into lobules, for the most part, disappears. The original texture is observed longest in the neighbourhood of the external interlobular fissures. In this situation, I have found portions still in a state of induration, after the mass of the tumours had passed into the third stage. I am led to conclude that the encysted medullary tumour follows precisely the same progress as that just described. The non-encysted medullary tumours may exist in any part of the body; but they are most frequently met with in the loose and abundant cellular tissue of the limbs, and in the larger internal cavities. I have met with them in the cellular membrane of the fore-arm, thigh, neck, and mediastinum; they are still more frequently found in the cellular substance around the kidneys and the interior part of the spine, and in these situations they often have a very large size. Although they are frequently found in the viscera, they are, however, much rarer there than in the cellular substance.

3. *Infiltration of organs by the matter of medullary tumour.*—As I have never met with this variety in the lungs, I shall not describe it in this place. I may merely observe that it is distinguished from the unencysted kind, by forming masses not at all circumscribed, in which the medullary matter approaches nearer to the imperfect or crude state, the more distant it is from the centre of the tumour. It exhibits, moreover, a very heterogeneous appearance, produced by its intermixture, in different proportions, with the different organic tissues amid which it is developed.*

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* The anatomical history of Encephaloid Cancer, as given by Laennec, has been like that of Tubercle, questioned in almost every particular. According to most pathologists, Scirrhus and Encephaloid Cancer are not accidental productions or tissues of new formation, developed *in toto* within the substance of other organs and preserving a sort of individual and peculiar life. On the contrary, they are regarded as mere modifications of some natural tissue, the cellular, or cellulo-fibrous—assuming different forms according to the mode in which the particular elements

During the greater part of the progress of Encephaloid Cancer, there is no fever, and in many cases it proves fatal without having even occasioned any change in the pulse. When fever makes its appearance, it is commonly owing to some accidental circumstance, as when the tumour presses upon any important organ, and occasions great irritation or inflammation. This disease may also exist for a long period without producing emaciation; but this state always supervenes before death, and then makes rapid progress. The only cases in which death supervenes without previous emaciation, are those in which the fatal result is immediately owing to the situation of the tumours, by the compression they make on organs essential to life, as the brain or lungs. On the other hand, the emaciation begins almost as early as the disease itself, in certain cases where the affection is so situated as to be capable of occasioning a colliquative discharge, as in the uterus. Dropsy is not a necessary effect of this disease, although it comes on very frequently towards its termination, particularly if it is situated in the liver or womb.

From the preceding account it results, that the stethoscope ought to point out the existence of the medullary tumour of the lungs, when this is of considerable extent. In the work of M. Bayle there is a case of this disease in the lungs (Case XXXVI.) communicated to him by me. I shall not add any case in this place, as the medullary is very easily distinguishable from every other species of cancer.*

CHAPTER XIII.

DISEASES OF THE PULMONARY VESSELS.

Organic lesions of the vessels of the lungs are extremely rare. The branches of the pulmonary artery are, no doubt, preserved

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tary tissue is continued in the composition of the different organs. According to this view, Scirrhus is merely an hypertrophy of the cellular tissue carried to such an extent that all the cells are obliterated and the whole mass condensed into a homogenous and apperently lardaceous substance. Encephaloid Cancer is, in like manner, nothing else but the same cellular tissue more or less hypertrophied or otherwise altered, and into which is deposited, by a true morbid secretion, a peculiar inorganic matter having some resemblance to the substance of the brain: this matter may be separated from its investing tissue by strong pressure, and only retains an appearance of organization, because some remains of the cells and vessels of the tissue in which it is deposited, still are visible amidst its mass. (Broussais, *Phleg. Chron.* t. i. p. 22, et seq.—Andral, *Clin. Méd.* t. iv. p. 404. Cruveilhier, *Nouv. Bib. Méd.* Janv. & Fev. 1827).—(*M. L.*)

* The disease described in this chapter was noticed by the English surgeons before it attracted the attention of our author. Their researches, however, were entirely unknown to him when he first published his account of this disease. It was

from aneurismatic affections, by their softness and elasticity; and I have never seen recorded, nor met in practice, with any examples of ossification in them. The same remark applies to the bronchial arteries, which are perhaps protected from both lesions by the smallness of their diameter. The pulmonary veins seem equally exempt from organic derangement. I have never met with an instance of the varicose state of them, mentioned by Riolan and two or three other observers.* The only structural lesion I have met with in these veins, is an infarction produced by the concretion of their contents, and which I shall notice when treating of diseases of the organs of circulation. I formerly remarked, that the vessels of different orders, particularly the blood-vessels, are frequently compressed and completely flattened in the vicinity of tuberculous masses; and the same remark may be extended to every other kind of engorgement or obstruction of the pulmonary substance. In hepatization from pneumonia, and even in the hæmoptysical infarction, when it has become hard, in whichever direction we lay open the indurated portions, we find only very few vessels, and in some cases, we cannot observe over the whole extent of a surface of several inches square, a single open vessel. In these cases, injections thrown into the pulmonary artery or veins, scarcely penetrate the hepatized parts, and only very imperfectly the larger trunks, as has been remarked by M. Cruveilhier. I had formerly occasion to remark, that the compression of the vessels produced by the tuberculous infarction of the lungs, frequently occasioned their complete obliteration, either within the bodies of the tuberculous masses, or on the walls of the excavations which succeed these. The same thing must happen after chronic pneumonia, particularly that which supervenes to gangrenous eschars. Indeed, in this case, the obliteration of the greater number of vessels is quite evident; and I formerly remarked, that the dryness of the part affected, is one of the essential characters of this organic lesion. The pulmonary vessels are likewise more or less

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noticed by Dr. Baillie in his *Morbid Anatomy*. published in 1796, under the name of the *pulpy testicle*; but it was Mr. John Burns, of Glasgow, who first called the attention of practitioners to this affection, under the name of *spongoid Inflammation*, in his *Dissertations on Inflammation*, published in 1800. Mr. Hey, of Leeds, without any knowledge of what had been observed by Mr. Burns, gave an account of the same disease (which he termed *fungus hæmatodes*,) in his *Practical Observations in Surgery*, published in 1803; and in the following year (1804) Mr. Abernethy described the affection under the name of *medullary sarcoma*, in his *Surgical Observations on Tumours*. But the completest and best account of this disease which we possess in the English language, is contained in Mr. Wardrop's *Observations on Fungus Hæmatodes or Soft Cancer*, published in 1809. In this work the author notices the disease as existing in most of the organs of the body. In 1811 it was [illegible] by Dr. Monro (*Morbid Anatomy of the Gullet*, p. 160,) under the name of [illegible] *tumour of the mucous membranes*. Since then the periodical publications have teemed with cases of this disease. For an accurate history and delineation of this disease see Dr. Carswell's *Pathological Anatomy*, Fasc. ii. & iii —*Transl.*

* *Sepulchret*, t. ii. sect. iii. obs. vii. *Caldani* Memoire di Fisica del. soc. Ital. di Modena, tom. xii. part second.—*Harles*, in Ploucquet,

flattened, when the lungs are compressed against the spine, by a pleuritic effusion, but in this case, as well as in the obstruction of hæmoptysis and acute pneumonia, when the compressing cause is removed, the blood circulates anew in its wonted channels, there not having been sufficient time to cause adhesion of the sides of the vessels to each other. The knowledge of this state of compression of the pulmonary vessels, in all cases of pulmonary obstruction, ought to encourage us to practise the operation of empyema, with more boldness than is customary. We know that it has more than once happened, that the surgeon, after penetrating the intercostal muscles, has not ventured to proceed further, on account of meeting with a dense substance, which he has been afraid to penetrate, lest it might be the lungs themselves, but which was in most cases merely a false membrane. Such a doubt will hardly be entertained at present, except under certain circumstances which are extremely uncommon, as will be shown in the chapter on pleurisy. But without reference to these signs, we may be assured, that in every case where the sound of respiration and the resonance on percussion are altogether wanting, and have been so for some time, in one side of the chest, there is nothing to dread from an exploratory puncture; when these two signs are present, we are certain that there exists either an effusion into the pleura, or a chronic infarction of the lungs; in the first case, the operation will be proper, and in the last, we need be under no apprehension of any dangerous hæmorrhage, on account of the compression of the pulmonary vessels.

CHAPTER XIV.

OF NERVOUS AFFECTIONS OF THE LUNGS.

Sect. I.—*Of Neuralgia of the lungs.*

Although the lungs receive a great many filaments from the pneumo-gastric nerve, their sensibility of relation is very slight, even in a state of disease. In the most acute pneumonia and hæmoptysis, the pain is slight, and frequently altogether wanting, unless the pleura be at the same time affected; and we have shown that in the case of phthisis and catarrh, the patients can rarely point out the spot from which the expectoration proceeds. On the other hand, however, it is by no means rare to meet with individuals who, without any physical or rational sign of organic disease, and even while enjoying the most perfect health in other respects, suffer acute pain, sometimes even extremely acute pain, in the interior of the chest. This pain may be momentary or of long duration, intermittent or continued, confined to one spot or diffused, fixed or moveable; and sometimes it shoots by fits along the walls of the chest and neighbouring parts, in the course of the intercostal and anterior thoracic nerve, or the brachial plexus and its branches. It is frequently deep between the spine and scapula, and shoots from thence in such directions as lead to the belief that it is situated in the great sympathetic. I have been consulted by persons who had suffered from pains of this kind for several years; and in cases where they were of recent occurrence, I have known physicians, otherwise well informed, mistake them as indications of incipient pneumonia or tubercles, and prescribe bloodletting, with the effect of weakening but not relieving their patients. It appears to me evident, that these disorders are of the kind to which we give the name *neuralgia;* a class of affections which unquestionably have their site in the nerves, since the pains follow the course of these, but of the precise nature of which we are ignorant. In these cases, dissection has afforded variable results: frequently no morbid condition of the nerve has been found; sometimes it has been found smaller, at other times larger than natural. In some rare instances, the neurilemma has appeared red from injection of its vessels, or surrounded with a transparent jelly, without any mark of inflammation, or even sometimes (but very rarely indeed) infiltrated with pus. So great a variety of appearances ought, I think, to lead us to suppose, that these may be the consequence and not the cause of the neuralgia.*

The means which I have found most efficacious against these painful affections of the chest are, the different preparations of mercury, particularly frictions with corrosive sublimate, (from four to nine grains to half a drachm of lard,) repeated every second day, and always on a fresh place. These frictions I have sometimes continued for several months at a time: and when there is reason for fearing that this preparation may be too irritating to the organs of digestion or respiration, I substitute calomel in a like dose. I have also sometimes made trial of balsams, particularly copaiba, and turpentine combined with the balsam of Tolu, because of the known benefit derived from these, in large doses, in other cases of neuralgia, particularly sciatica. This remedy has the disadvantage of inducing a most distressing hypercatharsis, and of speedily disgusting the patients, if they are not immediately relieved. When the pains are fixed, I have frequently relieved them by the long-continued application of two magnetised plates, disposed in such a manner as to throw the magnetic current existing between them through the affected part.* When they are situated in the intercostal nerves, and, still more, in those branches which arise from the brachial and cervical plexus, and are distributed over the fore part of the chest, the application of a perpetual blister below the nipple, or on the lower part of the sternum, has often seemed to me of benefit.

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* There is one kind of neuralgia of the thoracic parietes which I have very frequently met with in practice, and which, I believe, is often mistaken for organic disease of some of the viscera of the thorax or abdomen. The pain is commonly seated about the middle of the false ribs; it is frequently of long continuance, and is often very distressing to the patient, but rather on account of its obstinacy than violence. It is observed almost always in young women, and is in most cases owing (I conceive) to pressure upon the intercostal nerve as it passes from the spine. I have adopted this opinion from having found it generally, if not always, connected with more or less of lateral curvature of the spine, and from having seen it always relieved, and often entirely removed, by means directed to remedy the spinal derangement. For a further account of these neuralgic affections of the lungs and other viscera, I refer the reader to a Memoir by P. Jolly, M.D., or an analysis of it in the Med. Chir. Rev. for July, 1828.—*Transl.*

We must be careful not to confound these neuralgic affections with other pains which are clearly sympathetic; such as the pains of the back so common in women subject to leucorrhœa; the sharp burning pains in different parts of the chest, arising from indigestion, flatulence, &c.; or the sensations of roughness, heat or oppression beneath the sternum, in certain cases of catarrh.

SECT. II.—*Of Nervous Dyspnœa.*

It was justly remarked by Corvisart, that the ancients confounded, under the name of *Asthma*, several varieties of dyspnœa arising from organic diseases of different kinds, and which they very improperly considered as nervous affections. Those varieties, in particular, which depend upon organic lesions of the heart and large vessels, had especially engaged this author's attention. In a former part of the present work, I have shown, that the most common cause of dyspnœa, when of sufficient severity to be termed asthma, is a dry catarrh, latent or manifest, and emphysema of the lungs, the consequence of this. Œdema of the lungs may also, but rarely, have so slow a progress as to give rise to similar symptoms. Effusions into the cavity of the chest can hardly be enumerated among the causes which occasion asthma; or, at least, the difficulty of breathing (often extreme) produced by these, could not be confounded with the spasmodic asthma of pathologists, except by the most inattentive and uninformed observer: in fact, exclusively of the physical signs of the effusion, the progress of the disease in this case, its comparatively sudden invasion, and its duration, (a few months at most,) have nothing in common with the insensible development and chronic and lengthened course of nervous asthma. We may, in like manner, frequently consider as originating in an organic source, the breathlessness which often accompanies fits of apoplexy, epilepsy, hysteria, and syncope; since, in most of these cases, it is evident that the disorder of the circulation is the cause of that of the respiration, and that this last is occasioned by the temporary congestion of blood in the vessels of the lungs.

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* The recommendation of magnetism, as a remedial agent, by our author, much more his assertion of benefit derived from it, will probably be met by the incredulity, if not the contempt, of most English readers. Although not prepared to corroborate, from experience, the utility of this practice, I am, nevertheless, far from considering it as unworthy our consideration, much less as entitled only to contempt, as the offspring and pretence of quackery and delusion. The close analogy, perhaps we might say identity, of this power (more particularly as relates to the living body) with electricity and galvanism, whose influence on the system is well known, and, yet more, the astonishing and now unquestioned power of *acupuncture* in many neuralgic and other diseases, ought to make us hesitate ere we reject magnetism as a remedial agent, even if we had not the testimony of practical men in favour of its positive efficacy. See the Report of the Commission appointed by the Royal Society of Medicine of Paris, in 1775, to investigate this question, published in their memoirs.

Since the preceding part of this note was written, (1827,) magnetism has been employed on the continent and in England, to some extent, in neuralgic affections, and it is said with considerable benefit.—*Transl.*

But in the cases now under consideration, and in which the dyspnœa and oppression are often extreme, we have frequently no sign whatever of vascular congestion, or of any other organic lesion; and, consequently, we must attribute them to disorder of the nervous influence simply. The same proposition is still more incontestable in many other instances. Many persons of a delicate and mobile constitution, cannot sustain a lively emotion, whether from physical or moral causes, without being immediately seized with intense dyspnœa; and indeed this is the only form which a *nervous attack* assumes in many women. Now, in cases of this kind, the circulation is frequently not at all affected.—The dyspnœa which is so easily produced by the slightest exercise in very fat subjects, is also, in great part, nervous, and must be chiefly attributed to the great expenditure of nervous influence required to move a mass so disproportioned to the ordinary powers of motion. In this case, no doubt, the acceleration of the circulation by the bodily exercise, acts as an accessory cause of the dyspnœa.—In some rare instances, it is very probable that dyspnœa originates in an imperfect paralysis of the diaphragm and other muscles of inspiration, this is, indeed, self-evident in those cases of palsy produced by compression of the spinal marrow above the fourth cervical vertebra; and we, moreover, now and then meet with pains (usually called *rheumatic*) in the thoracic parietes, which terminate in torpor, as in cases of hemiplegia, and which give rise to great oppression. In examples of impeded respiration, whatever was its cause, I have frequently seen its violence lessened (more rarely increased) by the patient merely shutting his eyes. I have seen the same thing in many other pains in different parts of the body, and particularly in pains of the stomach and intestines, (so intense as to simulate those of inflammation,) which the patients could remove or induce at pleasure, by merely opening or closing the eyes, or by turning their look to or from a bright light. In such cases, it is evident that the effects can only depend on the stimulation communicated to or subtracted from the brain by the light; and, consequently, that disorder of the nervous influence simply, without any organic lesion, may give rise to dyspnœa, as well as other nervous affections.

Among the instances of dyspnœa of sufficient severity and permanence to merit the name of *Asthma,* I shall notice in this place two kinds to which we cannot assign any discoverable organic lesion, and which we must consequently consider as nervous: the first of these I shall denominate *Asthma with puerile respiration;* the other is the common *Spasmodic Asthma* of practitioners.

I.—*Asthma with puerile respiration.*

The wants of the system, in respect of respiration, may be exactly measured by the intensity of the respiratory sound. I have already stated, when treating of the exploration of the respiration, that the intensity of the respiratory sound varies much, according to many circumstances, and particularly according to the age of the individual, it being much greater in infancy than in adult life. Whatever be the cause of this phenomenon, there is no doubt of its existence. There is no morbid affection which can be more satisfactorily referred to simple disorder of the nervous influence, than this dyspnœa, accompanied with puerile respiration, and which I formerly alluded to. In cases of this kind, the respiratory sound has resumed all the intensity which it possessed in early infancy; we perceive distinctly the pulmonary expansion taking place with uniformity, completeness, and *puerile promptitude,* in all the air-cells; and yet the patient is oppressed in his breathing, or, in other words, he constantly feels the want of a still more extensive respiration than he enjoys. The lungs, dilated as they are, in an extraordinary manner for an adult, nevertheless have not capacity enough to satisfy the wants of the system. This affection is sufficiently common in persons affected with chronic mucus catarrhs, attended by a copious and easy expectoration. In such cases, the dyspnœa is frequently very intense, and is sometimes so aggravated by the slightest motion, that the patient, though otherwise in pretty good health, is condemned to a life of inactivity, or even to an almost complete state of immobility. Attacks of asthma, however, properly so called, are less frequent in such subjects, than in those affected with the dry catarrh. In these latter cases, the imperfection and small extent of the respiration easily account for the oppressed breathing. But in the others, even during the severest attacks, the completeness with which the respiration is performed, is quite astonishing; the sound of it is quite puerile; and, as in the case of a strong and healthy child, we are sensible of the dilatation of the pulmonary cells to their full capacity, and over the whole extent of the chest. Nevertheless, the patient is oppressed, and, as I have already stated, would require a more extensive respiration than his organization allows; in other words, the respiration is very perfect, but the wants of the system in relation to it are increased beyond the standard of health. In such cases it is not in the lungs that we must look for the cause of the disease, but in the innervation or nervous influence itself: and this will hold equally good, even if we adopt the chemical theory of respiration, and refer the dyspnœa to an extraordinary want of oxygen in the blood. If the temporary obstruction of the bronchi by a little mucus, impedes the transmission of the air to even a small portion of the lungs, the patient experiences an extreme oppression. Such a circumstance, however, is uncommon and usually of short continuance, since the expectoration is commonly in such cases very free. I have never met with this species of asthma, except in persons affected with chronic mucus catarrh; and, indeed, I am of opinion that the dyspnœa arising from the mere increase of the natural want of the system for respiration, can never amount to asthma, without the catarrhal complication. This want of the system for respiration, varies, as I have already said, according to the age, and also in individuals of the same age. The adults and old persons who have puerile respiration without catarrh, are not, properly speaking, asthmatic; but they are short-breathed, and dyspnœa is induced by the slightest exercise; though when sitting still, they frequently experience no oppression whatever. The dyspnœa which takes place in some kinds of nervous affections, particularly hysteria, is frequently of the kind we are now treating of, viz. with puerile respiration. The increase of the necessity for respiration is not confined to the cases of which we have been speaking; it sometimes also supervenes in cases where the asthma is owing to other causes. Thus we frequently find an attack of asthma begin and terminate, without any difference in the state of the respiratory sound,—it being equally feeble through the whole; and in such cases, where the attack is not occasioned by a congestion of blood in the lungs or the supervention of a fresh catarrh, it appears to me that the paroxysms can only be considered as a temporary augmentation of the want of the system for respiration, occasioned, in all probability, by some unknown modification of the nervous influence.

II.—*Spasmodic Asthma.*

In the infancy of pathological anatomy, every kind of dyspnœa which was not connected with an evident inflammatory condition of the thoracic organs, was considered as spasmodic asthma. The nosologists of the last century, who attempted to divide diseases into species characterised by the aggregation of their symptoms, and more especially Sauvages and Cullen, defined asthma to be—a dyspnœa recurring in paroxysms after intervals in which the respiration is sometimes quite natural; each paroxysm having a daily aggravation, coming on commonly towards evening or at night, and going off in the morning with a more or less copious expectoration. In the present day, many physicians among those who have most cultivated pathological anatomy, formally deny the possibility of a spasmodic dyspnœa, and this opinion is also embraced by the majority of the remaining practitioners. There can be no doubt that the symptoms just mentioned, are met with in many cases of dyspnœa which evidently depend on organic lesions,—particularly chronic catarrh, whether dry, pituitous or mucous, and hypertrophy or dilatation of the heart. Sometimes also, the oppression produced by effusion into the chest, exhibits a well-marked nocturnal access. With the view of clearing up this question, I shall examine it, in the first place, in an anatomical and physiological point of view, and shall then consider the facts of pathology which may tend to set it at rest.

Every spasm supposes, at least, contraction of a contractile organ: this is what is called *tonic* spasm. When there is alternate contraction and relaxation, the spasm is called *clonic*. Some physiologists are further of opinion that, in certain organs, particularly such as are hollow, the contraction does not alternate a mere relaxation (the consequence of an intermission in the contractile process), but with an active expansion of the part. Let us now enquire whether the bronchi and air-cells possess either of these qualities.

Reisseissen, as I formerly stated, has ascertained the existence of a set of completely circular fibres around the bronchial ramifications, beginning at the point where the cartilaginous circles terminate. I also mentioned that I had myself verified the correctness of his observation upon branches of less than a line in diameter; and may now add, that, although it appeared to be difficult to follow to a greater distance the muscular fibres, analogy leads us to admit their existence, certainly in the smaller branches, and perhaps even in the air-cells. Taking this view of the subject, it is very conceivable that the spasmodic contraction of these fibres may be carried the length of obstructing the air-passages to such a degree as to prevent the transmission of air to a great portion of the lungs. For these reasons, we cannot regard the tonic spasm of the bronchi, or even perhaps of the air-cells, as impossible; since every muscle is susceptible of spasm. Besides it is by no means demonstrated, that muscular fibre is the only contractile tissue; indeed, the contrary is proved by the fact, that animals of almost a mucilaginous consistence, are capable of evident contraction. In regard to expansion,—a phenomenon more or less observable in several organs, such as the penis, nipple, heart, retina, uterus, and perhaps even in the cellular substance and the brain,—its mechanism is so little understood that physiologists have been forced to admit, in order to explain it, a vital property under the name of *expansibility* or *expansile power*.[*] Without investigating the probabilities of this theory, I shall here content myself with enquiring, as a matter of fact, whether the lungs are capable of an active expansion, independently of that which they undergo, from the effects of atmospheric pressure, in following the dilatation of the walls of the chest during inspiration. If we lay open one side of the chest of a living dog, we find the lung at first reduced to one-fourth of its former dimensions; but even in this state we observe it swelling and contracting with an alternate motion. This fact was noticed by M. Roux,[†] who further remarks, that we cannot account for the escape of a portion of lung in the case of a wound of the chest, but by an active expansion of the viscus itself. To this I may add that, in the case just stated, the protruded portion has been observed to be dilated during inspiration, a result which could not, under such circumstances, be occasioned by the pressure of the atmosphere. Another argument in favour of the inherent activity of the lungs, is furnished by the fact, of old persons being still able to breathe, and often even without any previous dyspnœa, in whom the cartilages of the ribs are ossified, and the ribs themselves immoveably united with the vertebræ. In such cases it is not probable that the diaphragm is the sole agent in inspiration and expiration.

The study of respiration by means of auscultation, furnishes us, both in health and disease, with still more numerous phenomena which leave no room to doubt that the lungs possess an inherent power of action, independently of the other powers of inspiration and expiration. It was formerly stated—1. that a healthy adult cannot, by any effort of inspiration, give the puerile character to his respiration; while, on the other hand, this character returns, even during the slightest inspirations, when a great portion of the lung has been rendered impermeable by some organic lesion;—2. that a forced inspiration, particularly if the patient fancies that we expect him to breathe in an extreme degree, gives hardly any sound at all, and is consequently very incomplete;

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[*] Dr. Prus has attributed this property to many other organs and tissues, and particularly to the bronchi. However much disposed to adopt this opinion, I cannot regard all his facts as probable, particularly the visible dilatation of the bronchi, which I formerly stated to be owing to mechanical causes. *De l'Irritation, &c. par V. Prus, M. D, Paris, 1825.—Author.*

[†] Mélanges de Chir. &c. p. 87.

and—3. that the convulsive and sibilous inspiration that takes place in the fits of hooping-cough, is not accompanied by any sound of pulmonary expansion, and appears not to force the air into the air-cells. I have observed the same thing, but not constantly, in sobbing and yawning: I have not attended to the sound of respiration in sighing. An inspiration made intentionally, and by repeated efforts, without any intermediate expiration, yields very little sound, or none at all. All these phenomena appear to me inexplicable without admitting an inherent action in the lungs. We cannot comprehend how a portion of lung can regain the puerile character of respiration, unless we admit an active expansion of the organ; for we know that this kind of respiration is not accompanied, at least not constantly, by a more extensive inspiration than usual; and, moreover, it frequently happens that the sound of respiration, which is frequently scarcely perceptible in such inordinate inspirations, becomes immediately afterwards puerile, during much feebler inspirations, as any one may assure himself by an experiment which I shall immediately notice. On the other hand, the great inspirations which do not throw the air into the air-cells, can only be attributed (except in cases of pulmonary infarction, not now under consideration) to a spasm of the air-cells themselves, or, at least, of the smaller bronchial tubes. I had learned by experience that the inspiration which precedes and follows coughing, frequently produces a pretty strong respiratory sound in persons who yield hardly any during a common inspiration, and I was first led to attribute the effect to the displacement of mucus by the cough; but having since observed the same thing in individuals who did not cough, and who, in the intervals of the attacks of asthma, afforded no symptoms of dry catarrh, I began to suspect that the phenomena just mentioned might be owing to a spasm of the bronchi. With the view of elucidating this point, I endeavoured to produce the same effects by augmenting artificially the necessity for respiration, and succeeded perfectly. Accordingly, when I meet with a patient in whom the respiratory sound is very weak, or even entirely wanting, in more or fewer parts of the chest, without there being any sign of dry catarrh or other organic affection which could produce this effect, I desire the individual to read aloud, and to continue to do so as long as he possibly can, without drawing his breath, and when he stops, to take steadily a deep inspiration. Such an inspiration constantly produces a well-marked respiratory sound, and sometimes one which is very loud. Moreover, it frequently happens during this proceeding, that the patient, forgetting the recommendation given him, yields unconsciously to the necessity of breathing, in the middle of the experiment, and takes a small furtive inspiration. And it frequently happens that this inspiration, short as it is and unaccompanied by any perceptible elevation of the walls of the chest or abdomen, produces a momentary return of puerile respiration, in the very points in which the forced inspirations had produced no respiratory sound at all. In the case of persons who cannot read, we may make the same experiment, by getting them to recite something which they know by heart, such as prayers; or merely by causing them to retain their breath as long as they possibly can, and then to breathe at their ease. These facts appear to me inexplicable, except by the admission of a spasm of the air-cells and small bronchial tubes, which yields momentarily to the increased necessity of breathing. I have occasionally explored the respiration of fat persons, just as they had reached, in a state of breathlessness, the top of the stairs; and also that of strong healthy young men of different constitutions, just as they had run themselves out of breath. In both these cases, I find the respiratory sound very indistinct, and frequently it is imperceptible over the greater part of the chest: and it does not become very distinct until after the individual is rested, and the inspirations have resumed their natural frequency. No doubt, in these instances, the congestion of blood which takes place in the lungs, has some influence in producing the effects witnessed; but that this is not the principal cause of them, is proved by the chest continuing to be perfectly sonorous. From these experiments, and those formerly related when treating of the exploration of the respiration, I am convinced, not only that the air cells and the bronchial tubes can be spasmodically contracted, but even that the will has some power over this contraction. This seems proved by the fact, that persons in perfect health can make inspirations which give rise to no sound; and indeed this is almost invariably the case, as I formerly stated, when they make an extraordinary effort to breathe deep, from a belief that we expect something very unusual. I have met with only a very small number of asthmatics, in whom there was evidence of pulmonary spasm, without any attendant catarrhal affection; but some few I have met with. On the other hand, I have known a great number of patients, in whom the catarrh, whether dry, pituitous or mucous, was too slight in degree or too small in extent, to be considered as the real cause of their asthma. In several of these, the sound or percussion was not good, although there was no sign of pulmonary infarction present; and I am much disposed to believe that the long-continued contraction, or at least moderate distension of the air cells may, by rendering the pulmonary tissue more compact, produce the same effect.— It is difficult to derive from morbid anatomy any light to clear up the question. An attack of purely nervous asthma is rarely fatal, and indeed is hardly ever so, without giving rise previously to congestions of blood, and other consequences of the disorder of the respiration and circulation induced by it; and in these consequences prejudiced minds may see the *causes* of the disease. Some cases, however, exist, which lead irresistibly to the belief of the possibility of an asthma purely nervous. I do not speak of cases drawn up at a period when this possibility was generally considered as amounting to an incontestable fact, and when spasmodic asthma was reckoned to be a disease very common and very well understood. But even at the present time, when the eyes of medical men are particularly directed to this point, and when many of the best-informed members of the profession doubt whether there really exists any severe disease depending on simple disturbance of the nervous influence and without any primary organic lesion,—I have met with many cases in which it was impossible, after the most minute research, to find any organic lesion whatsoever, to which the asthma could be attributed. An instance of the same kind is given by M. Andral (Cl. Méd. t. ii. ob. xx.) in the case of a fatal suffocation supervening to the suppression of a discharge from an ulcerated leg. The lungs in this case were sound, except that there existed in the left lower lobe a small hepatized point, of less extent than the tenth part of the lobe (*pneumonia of the dying*, according to all appearances.) The heart and the other organs were equally sound. M. Guersent has likewise seen two children die, after a few days, of a remitting dyspnœa, attended with dry cough and precordial anxiety, in whose bodies no obvious lesion could be found after death. (Dict. de Méd. t. iii. p. 126.) I am convinced that in the greater number of asthmatic cases, depending on dry catarrh and pulmonary emphysema, the asthmatic paroxysm can be induced equally by the supervention of a fresh catarrh (latent or manifest) and by a deranged state of the nervous influence, occasioning pulmonary spasm or an increase of the necessity of respiration, and sometimes by both causes at once. In fact, I believe there are few cases of asthma owing to any one of these causes; and in old men more particularly, I imagine that several frequently conspire to produce the result. Of this kind are, debility, the ossification of the cartilages and immobility of the ribs, rheumatism affecting the walls of the chest, and perhaps also the tenuity of the air-cells and of all the pulmonary vessels, in advanced life. With the exception of the different kinds of catarrh, the occasional causes of attacks of asthma and dyspnœa are almost always of a kind to give occasion to an immediate and evident disturbance of the nervous influence. Of this kind are, strong mental emotion; venereal excesses; the influence of light or darkness; retrocession of gout (an affection which, from its mobility and various effects, can only be considered as a nervous affection;) certain odours, such as those of tuberose, heliotrope, stored apples, &c.; changes of the atmospheric electricity, and other less appreciable conditions of the atmosphere. We thus find that the greater number of asthmatic patients cannot remain with impunity in a low close apartment, although containing much more air than they could consume in twenty-four hours, and although it is constantly but insensibly renewed by the doors and chimneys. Some cannot bear, without experiencing a feeling of suffocation, that any person should go before them, or that any thing should be brought close to them; while others, on the contrary, are never more subject to dyspnœa than when in the midst of a vast plain. The following fact, communicated to me by one of my colleagues, affords a curious example of a nervous affection of a similar kind, in a person not subject to asthma. A man forty years of age, slightly hypochondriacal, but otherwise in good health, wished to go on horseback to pay a visit some leagues distant from his house. As soon as he left the town where he resided, which is situated in an extensive plain, he felt an immediate oppression on the chest from the impression of the country air. He took no notice of this at first; but the dyspnœa having greatly increased, and being now attended by a sense of faintness, he determined to return. He had scarcely turned his horse, when he found himself better; and in a few minutes he recovered both his breath and his strength. Not suspecting any relation between this momentary uneasiness and his journey, he once more attempted to advance, and was again soon attacked with the dyspnœa and faintness. On turning towards the town these passed off. After having made repeated attempts to proceed, and always with the same result, he finally returned, and in just as good health as when he set out. I lately met with a case very analogous to the one just related, only that in this, the symptoms were more severe, and the cause different, being the want of light and a free circulation of air. Count H. a man of a robust constitution, and although now eighty-two years of age, still possessed of a degree of vigour unusual even at the age of sixty, has been subject from his infancy to attacks of asthma, and is habitually somewhat short breathed. Since his fiftieth year he has had a slight cough, and, in the morning, a pituitous expectoration intermixed occasionally with some yellow spots. The asthmatic attacks have always been infrequent with him, but they have invariably come on if any person has inadvertently shut his bed-room door, or if his night lamp has by any chance gone out. As soon as either of these accidents occurs, he immediately awakes with a feeling of oppressive suffocation, and after a few minutes becomes insensible. I have explored the chest of this patient, and have only detected some signs of a slight pituitous catarrh; the sound of respiration is middling, as it ought to be in the adult, and is intermixed, in a few points only of small extent, with a slight sibilous or mucous rhonchus. On the occasions alluded to, the attack is got rid of by opening the doors and windows, lighting the candles, and carrying the patient into the open air; but the oppression remains, in a certain degree, for several hours.

The volatilized oxyds of lead, the effects of which on the nervous system are incontestable, frequently give occasion to asthma, as has been remarked by many authors both ancient and modern (*Ploucquet*, Art. *dyspnœa.*) It is moreover worthy of remark, that most fits of asthma are accompanied by an extraordinary accumulation of gas in the intestines, a circumstance which is equally observable in other nervous affections. Other nervous symptoms, of greater or less severity, and more especially convulsive motions in various parts of the body, are likewise frequent attendants on asthma. Furthermore, if we carefully study, and for a certain length of time, the dry catarrhs, whether latent or manifest, which almost always accompany hypochondriasis and continued fevers, we shall find that the organic disease is under the direct influence of the nervous affection, and is, indeed, probably produced by this; since we find that it (the catarrh) is increased as often as the deranged condition of the nervous influence is augmented by a lively emotion or by any other cause.—From all these facts and considerations, I think I am entitled to conclude, that the greater number of asthmatic paroxysms, although depending on several causes combined, are chiefly induced by a primary and momentary alteration in the state of the nervous influence.*

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* In the article *Asthma* of the Cyclopædia of Practical Medicine, I have given a pretty full view of the history of the disease here treated of by Laennec, and to this I must refer the reader for more particular information. The following brief extracts will point out the distinctions which reasoning and observation have led me to adopt, in regard to the varieties of asthma. I will merely premise that I consider the arguments in the text (and many others might be adduced) as sufficient to prove the existence of a *nervous asthma* properly so called, that is, an asthma unattended by any organic lesion of the thoracic viscera.

"It must not be imagined that we consider the asthmatic paroxysm as consisting exclusively of a muscular spasm of parts otherwise healthy. This, indeed, may be the case in a few instances; but it is not to be doubted that, in the great majority of cases, the spasm not merely affects parts previously diseased, but that the phenomena of the paroxysm are partly dependent on, and greatly modified by, these very lesions co-existing with the spasm, aggravating it, and, in turn, being aggravated by it...... We shall divide cases of asthma into two classes or groups, according as there exists a sound or a diseased state of the bronchial membrane in the intervals of the paroxysms; terming those of the first class *nervous asthma*, and those of the second *catarrhal asthma*.

I. *Nervous asthma.*—The characteristic quality, or, at least, the most manifest physiological peculiarity of the individuals subject to nervous asthma, is the extreme susceptibility of their nervous system. They are said, in common language, to be *nervous*, or to possess the nervous temperament. This is the asthma of hysterical females, and is indeed, in many cases, only one of the multiform aspects of hysteria. It, however, occurs equally in males, and in females who have no other symptom of hysteria.

For the sake of those who are curious in nosological arrangements, rather than as being of any practical value, the following classification of the various cases which come under the head of nervous asthma is submitted to the reader.

1. In a very small proportion of these cases we cannot detect any disorder of the system, general or local, which can be considered as at all influencing the occurrence of the paroxysms. These may be termed cases of *pure nervous asthma*.

Treatment. Since, as I have just said, the periodic asth
commonly depends on the re-union of several organic and nerv

2. In an infinitely larger proportion of cases we find more or less of disease in the system generally, or in some of the principal organs; and which disease appears to be the remote cause of the paroxysms, influencing the bronchial muscles indirectly through the intermedium of the brain. Such cases may be termed *sympathetic* [illegible] *asthma.* This order may be subdivided into species, according to the nature of the affection which constitutes the remote cause of the paroxysm.

3. In a third group may be included, under the name of *symptomatic* [illegible] 1, those cases which depend on diseases immediately affecting the pulmonary [illegible] themselves, and 2, those in which the paroxysms are directly induced by [illegible] disease of the lungs, head, pleura, &c.

II. *Catarrhal asthma.*—In studying the various cases of asthma met with in practice, while we find, in the vast majority of instances, some fixed affection of the bronchial membrane, we find great variety in the nature, and still more in the degree of this affection. In one class of cases there seems to be merely some peculiar modification of the sensibility of the bronchial membrane, which renders it susceptible of being excited to morbid action by various external influences. In others, however, and in an infinitely larger number, there exists either an habitual catarrh of a formal character, or such a predisposition to be affected by catarrh, as practically to amount to a like condition of the parts..... Sooner or later, and generally very soon, the mucous membrane becomes disordered permanently; and it is this local disease of the lining membrane of the air-passages, together with the general liability to be affected by slight degrees of cold, which constitutes the most common state of persons subject to asthma. Between the extreme limits of this bronchial affection, from mere increase of sensibility up to the most acute inflammation, the degrees or shades are infinite.

The catarrhal affections with which the asthmatic spasm may be combined may be either (A) *acute* or (B) *chronic.* Of these the chronic varieties are by far the most common.

A. 1. The first variety of the chronic catarrhal asthma is ranged under the present head more from analogy than from any certain proof of its being essentially of a catarrhal nature. Its essential characteristic seems to be a peculiar morbid sensibility or irritability of the membrane lining the bronchi, rather than any sensible physical alteration of it. If a name is desired for it, it might, in the language of [illegible] be termed *latent catarrhal asthma*.... This peculiar irritability of membrane in many cases continues perfectly latent until rendered manifest by the application of certain stimulants. Some individuals are affected by only one kind of substance, others by two or more. Ipecacuanha seems the substance which, of all others, exerts the greatest influence in cases of this kind.

2. The next variety of chronic catarrhal asthma is that which is complicated with the disease termed *dry catarrh* by Laennec. It may, therefore, be denominated [illegible] *catarrhal asthma.* It is, perhaps, the most common form of asthma. (See the chapter on *Catarrh* in the present work.)

3. The third variety of chronic catarrhal asthma is that which is combined with the common chronic mucous catarrh. It is the *humoral asthma* of the old authors. In conformity with the names given to the preceding varieties, it may be denominated the *mucous catarrhal asthma.* This form of catarrh is occasionally the consequence of those last described; but it is still more frequently produced by repeated attacks of the acute catarrh. It is the common chronic catarrh, frequent in old age, and by no means uncommon in youth. It is often the sequel of acute bronchitis, and is, indeed, itself only a form of the same disease in a chronic state.... The preceding are the chief affections of the bronchial membrane, of a chronic kind, with which the asthmatic paroxysm is complicated. There are some others of an acute character to be noticed, and which, when co-existing with the paroxysms of asthma, entitle it to the name of the *acute asthma.* Two forms of this species are met with in practice, sometimes sufficiently well marked to be readily distinguished; but frequently, like the other species of asthma, so intermingled as to render the discrimination impracticable.

B. 1. The first of these two varieties may be termed the *acute congestive* [illegible] Were it not that we frequently see the most extensive inflammation and consequent tumefaction of the bronchial membrane, without very great difficulty of breathing affections, it is necessary in every case to study with care all the elements of the disease, as it is this study only that can lead us to the most rational indications of cure. I shall not repeat in this place, what was formerly stated respecting the treatment of catarrh: it is with the view of fulfilling the indications supplied by this, that repeated emetics, soap, alkaline salts, kermes, squills, ipecacuanha in small doses, &c., have been had recourse to. Many means may be opposed to the disorder of the nervous function in which the asthma chiefly consists; but in this case, as in every nervous affection, nothing is more variable than the effect

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certainly without any of that extreme and peculiar dyspnœa which characterizes the asthmatic paroxysm, we might agree with Parry in opinion that mere vascular congestion, from sudden determination of blood to this membrane, might account for all the phenomena of asthma. And there can be no doubt that, in a certain class of cases, this determination of blood is not merely the precursor of the spasm, but that it constitutes the greater part of the pathological condition of the affected parts. Of course, there is some modification of the nervous condition of the membrane previously to the afflux of blood to it; but it is extremely improbable that this modification is of a spasmodic nature; on the contrary, it can hardly be doubted that it is the morbid congestion of the blood-vessels which irritates the muscular fibres into spasmodic stricture. 2. The last variety of catarrhal asthma which we shall notice may be termed *acute catarrhal asthma*. It only differs from the last in coming on more slowly, and in being complicated with a common catarrhal affection of the bronchial membrane, instead of a rapid congestion of the same. Reasoning *à priori*, one might expect cases of this kind to be very common. Such, however, is not the fact. The disease which has been termed the *hay asthma*, when amounting to that degree of paroxysmal violence deserving the name of asthma, belongs to the form now under consideration; although this affection is much more properly designated by the name of summer catarrh."

The following recapitulation, extracted from the same article, appears to me to embrace the chief points in the pathology of asthma, that are well established. [It will be remarked that I take no account of the very important class of cases immediately dependent on *disease of the heart*: these will be noticed hereafter under the name of *Cardiac Asthma*.]

1. In the disease properly termed asthma, there is always present a spasmodic contraction of the muscles of the bronchi, and sometimes a similar state of the muscles of the trachea, larynx, and external muscles of respiration.

2. In a small proportion of cases, the spasmodic stricture may take place (idiopathically or symptomatically) without any previous disease of the affected parts.

3. In the great majority of cases the spasmodic constriction is dependent on a pre-existing irritation of the mucous membrane of the air-passages.

4. Phenomena of a very similar character are sometimes the consequence of a congested state of the mucous membrane of the air-passages, without any attendant spasm.

5. The congested or tumefied state of the mucous membrane almost invariably accompanies the paroxysms, whether this state be a cause or a consequence of the spasm.

6. The violence of the paroxysms is modified no less by the degree of the congestion than by the degree of the spasm; a great congestion with slight spasm producing, probably, the same result as a slight congestion with a great degree of spasm.

7. In some cases, the tumefied or congested state of the bronchial membrane passes off entirely with the spasm, without any exhalation from the vessels or augmented secretion from the mucous follicles. More commonly there is a simultaneous relaxation of the spasm of the muscular fibres, and an exhalation from the mucous coat. This exhalation most commonly puts an end to the disease for a time; not unfrequently, however, the congestive passes to a more permanent state of inflammatory irritation, under the form of pulmonary catarrh or bronchitis." Cyc. of Pract. Med Vol. I.—*Trans.*

of medicines. Remedies which succeed best with a great number of patients, are useless to many others; and in the same individual, we find that a medicine which at first produced the best effects, and with surprising quickness, becomes entirely powerless after a few days. For this reason it is necessary to try successively several, and often very different means. I shall here run over the list of such of these as have proved most beneficial. I formerly took notice of narcotics as a means of lessening the need of respiration, and of the influence of sleep on dyspnœa. I may add to what was there stated, that in the case of animals which hybernate, the quantity of air consumed in their torpid state, is nearly a hundred times less than in the state of activity (being as 14 to 1500,) as was proved by Mangili in the case of the marmot placed under a glass receiver in water.* This observation which is allied to those above detailed, accounts for the state of tolerable health and freedom from dyspnœa, which many persons enjoy, whose respiration, examined by the stethoscope, is three or four times less than in the natural state. In these subjects, all that they require is that they approximate, in some slight degree, the condition of hybernating animals. This theory appears to me the more probable, from being founded on the very perfect analogy of several facts drawn from certain fortuitous observations, which seem, at first sight, very dissimilar: of this kind are —the cessation of the feeling of oppression during sleep and for a few minutes after awaking, in most cases of asthma, and the momentary relief of every kind of dyspnœa from the use of narcotics, and the effects of quiet and darkness. I may add to these the fact, that the greater number of persons affected with an extensive dry catarrh, and who are nevertheless free from any habitual oppression on the chest, eat little and sleep much; and it may be remarked as not at all surprising that there should be great difference as to the necessity of respiration in different persons, any more than in the necessity for food or drink. We every day observe, among men living in almost the same circumstances, some that eat four times more than others, and find a still greater disproportion in respect of drink.

Narcotics may act not merely by lessening the necessity of respiration, but also by overcoming the spasm of the lungs; and we ought, therefore, to have recourse to them in every case where the exploration of the chest enables us to detect either of these changes in the condition of the nervous influence. Experience has long since led medical men to make much use of medicines of this class, in the treatment of asthma; and the following have been particularly approved of: opium, belladonna, stramonium, phellandrium aquaticum, aconitum napellus, colchicum, tobacco, smoked or taken internally, cicuta, dulcamara, hyoscyamus. All these may be useful; and we are sometimes under the necessity of making trial of them one after another. The best general rule for their administration, is, to begin with a small dose, to increase this gradually, and to employ the plants in substance, well preserved and recently powdered. If we employ extracts, they must have been recently prepared and preserved with great care. No means would seem more proper for relieving the dyspnœa which originates in an increase of the necessity of respiration, than the breathing of oxygen. I have myself never made trial of it; and it is well known to have disappointed those who have employed it, notwithstanding the eulogies of Beddoes and Fourcroy. Besides narcotics, several authors have cried up certain vegetable substances which act powerfully on the nervous system, and, among others, lauro-cerasus, nux vomica, boletus, suaveolens, meadow saffron, &c. Substances of another class, and equally irritating to the stomach and nervous system, have been tried, such as the tincture of cantharides, the arsenical solution and also arsenic in vapour, the sulphate of zinc, the muriate of barytes. Of these the only ones I have made trial of are, the distilled water of the cherry laurel and the diluted prussic acid. They frequently ease the respiration, but less certainly than narcotics. The same is true of the nitric, sulphuric and acetic æthers.

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* V. I. Mueller, *De Respir. fœtus. Comm. physiol. Lipsiæ*, 1828.

After narcotics, no class of medicines has been more recommended, or is, indeed, more frequently beneficial in nervous dyspnœa, than the resins and fetid gums and some other medicines of analogous powers. Musk and castor, more especially, many times give more speedy relief; and gum ammoniac, assafœtida, camphor, singly or dissolved in the oil of petroleum, and myrrh, frequently relieve the dyspnœa, and moreover favour expectoration when there exists any catarrhal complication. Even the mere smell of these substances, and of very odorous or fetid substances in general, frequently produces a temporary alleviation; sometimes, however, it is injurious. When the asthmatic paroxysms have a strongly marked periodical character, cinchona frequently diminishes their severity, and sometimes stops them altogether. An English physician, Dr. Bree, has recently lauded the subcarbonate of iron, and coffee, as able not only to dissipate an asthmatic paroxysm when present, but to prevent its return. The last measure, however, had already been proposed by one of his countrymen, Dr. Percival, in his essays. I have myself seen several cases in which coffee was really useful. I have also found that the subcarbonate of iron, given in graduated doses, from a scruple to a drachm, was beneficial in retarding the accessions and in lessening their violence, in persons of a pallid and lymphatic constitution, and in habits relaxed by a long course of indolent enjoyment: and it has appeared to me equally beneficial whether the asthma depended chiefly on a dry catarrh, or was almost purely nervous, but more frequently so in the latter class of cases. Electricity, formerly cried up by Sigaud de Lafond, (De l'Elect. Méd. p. 250,) has been recently revived, particularly under the form of galvanism; and although it has frequently succeeded in lessening the dyspnœa, it has occasionally increased it. I have obtained analogous effects, but less quickly, from the application of the magnet.—Emetics appear frequently to act not merely as evacuants, derivatives, and expectorants, but also by directly influencing the nervous system; as their employment is often followed by an immediate alleviation of the paroxysm. Whatever be the occasional causes, or the elements of the asthma, we must never omit blood-letting whenever the lividity of the countenance, the strength of the patient's constitution, or the over action of the heart, indicate pulmonary congestion; but we must be careful not to abuse this practice, which in general produces only a temporary advantage. Venesection is rarely useful after the first days; and its too frequent repetition, by weakening the patient, induces a risk if not of life, at least of greatly prolonging the duration of the attack.*

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* The treatment of asthma, like that of all periodic diseases, consists of two parts, that proper in the paroxysm, and that in the interval. Laennec has not made the distinction sufficiently clear. It is chiefly in the paroxysm that blood-letting, narcotics, anti-spasmodics, emetics, expectorants, derivants, &c. are employed; although several of them are also had recourse to in the interval. I must here content myself with a few remarks on some of the more important of these means; and, in doing so, shall avail myself of the materials contained in the article *Asthma*, written by me in the "Cyclopædia of Practical Medicine." For further details I refer the reader to that article.

1. *Treatment in the paroxysm.—Blood-letting.*—The extreme suffering of the patient in the asthmatic paroxysm will very naturally suggest the employment of so powerful a remedy as blood-letting. This is, accordingly, one of the measures which the young practitioner is almost sure to have recourse to upon being first called to a severe case. Experience, however, will inevitably lead to opinions less favourable to its use than might be anticipated before a sufficient trial of its efficacy. It is no doubt, a very proper remedy in some cases; but it cannot be recommended as one that is generally either useful or safe. It may be occasionally necessary as an auxiliary to other means, or as a measure of precaution against the ill consequences likely to be produced by the paroxysm on other parts; but it should never be looked upon as a measure to be had recourse to, like many others, on almost empirical principles. It is a remedy too important to be trifled with. It never, I believe, puts an end to the paroxysm, much less does it cure the disease; and its habitual employment in an affection of frequent recurrence cannot fail to be highly injurious. It is indicated in the early attacks of young and robust subjects; in cases of great general plethora; in fits of great violence, in which the pulmonary circulation is much impeded, and the brain or other important organs are likely to suffer in consequence. Cases of this kind are denoted by the extreme violence of the dyspnœa, lividity of the face, stupor, &c. Bleeding with leeches is never proper in the asthmatic paroxysm; cupping may be occasionally useful, especially when there exists much cerebral congestion.

Narcotics, anti-spasmodics, &c.—Medicines of this class seem particularly indicated by the obviously spasmodic character of the paroxysm, and by its violence; and accordingly they have been very generally prescribed in it, in one form or other, from the earliest times. It must be admitted, however, that the success of such remedies has been very limited, and the practice but little trusted to by experienced persons, whether practitioners or the subjects of asthma. In the great majority of cases in which opium and the medicines termed anti-spasmodics have been employed, the have failed to afford any relief; while in many they have proved injurious, either at the time or in their subsequent effects. A little reflection on the pathology of the disease will readily explain this result. In most cases the only portion of the disease which such remedies are calculated to relieve, (the spasm,) is conjoined with and dependent on a pathological condition of the bronchial membrane over which they have little or no controul. This condition, if not positively inflammatory, is certainly of an analogous kind, and the experienced reader need hardly be reminded of the inutility (to use no stronger term) of anti-spasmodics in other cases of spasmodic stricture dependent on inflammatory irritation of the part, until this primary irritation has been reduced by remedies of another class. It is only in cases of pure nervous asthma, or in those symptomatic dyspnœas, simulating asthma, which depend on organic disease of the heart, &c. that opium and other narcotics and anti-spasmodics are at all likely to prove useful; and it is only in these cases that they should be prescribed. In the hysteric asthma the good effect of opium was long ago recognized by Willis, and I have myself seen it very successful in the spurious forms just mentioned. In the true catarrhal asthma I have never seen it useful, and have often seen it injurious.

Of this class of remedies our space will only permit us to refer to two or three of the principal:—*Stramonium* had formerly been strongly recommended by Stoerk and others in mania, epilepsy, &c. but experience of its inefficacy had long occasioned its discontinuance in such cases, when its use was again revived in English practice in the beginning of the present century, as a remedy for asthma. It had been previously employed in India in the same disease with much reputation, and it speedily attained great fame upon its introduction by Dr. Sims into this country. Since that time it has been very much used; and although its virtues are found to be greatly less than was at first believed, they have been satisfactorily proved to be such as to entitle it to the first rank among the temporary remedies of asthma. The mode of its administration is smoking it during the paroxysm, in the manner of tobacco. *Tobacco* has also been much employed by asthmatics, either in conjunction with stramonium, or by itself. It is considered in general as beneficial in the paroxysm, and, in the estimation of some old asthmatics, its effects are not inferior to those of the former medicine. Neither seems productive of relief unless expectoration is excited. *Lobelia Inflata* has for the last few years more than rivalled stramonium in public estimation; but I consider its pretensions to rest on much slighter grounds. It has certainly been occasionally productive of great and immediate relief, but has much more frequently failed altogether; and in cases where it had at first succeeded, it has lost its efficacy on repeated trials. I have found it occasionally beneficial in checking the paroxysm even in cases of catarrhal asthma, if given at the very commencement; but have found it more certainly successful, at least temporarily, in spurious cases produced by hydrothorax and disease of the heart. Further trials are necessary to enable us to speak confidently of its real merits. It is given in the form of a saturated tincture of the leaves, in doses of from half a drachm to a drachm and a half, or two drachms. *Coffee* has obtained considerable reputation in asthma. We are informed by Sir John Pringle, that "Floyer, during the latter years of his life, kept free from, or at least lived easy under his asthma, from the use of very strong coffee." If this be true, the Knight of Lichfield must have found some difficulty in reconciling the utility of this "hot drink" with his theories, or even with his past experience. But, be this as it may, Sir John Pringle assures us, on his own authority, that coffee is "the best abater of the paroxysms of asthma" that he has seen. He says the coffee is to be made very strong, ("an ounce for one dish,") and the dose to be repeated every quarter or half hour. This practice is sanctioned by Dr. Bree, and has been much used since the publication of his Treatise. My own observation and inquiries lead me to rank it with other narcotics and stimulants, and, therefore, to place no reliance on it as a general remedy.

Refrigerants.—Vegetable acids and neutral salts of a cooling nature have been considered beneficial by many, particularly nitre and vinegar. Remedies of this class have one great advantage over many others that have been used in asthma, that they are not likely to prove injurious, and may prevent the administration of such as are. Combined with mild diaphoretics and small doses of ipecacuan, I look upon them as the safest, and perhaps, on the whole, the best, in the most common cases, namely, the catarrhal. Indeed, it remains yet to be proved if, in the majority of cases of asthma, medicine possesses any resources superior to those found most useful in simple catarrh.

Derivants, in the form of stimulant pediluvia, sinapisms to the feet, &c. are recommended, most particularly by foreign physicians. I have repeatedly tried the warm foot-bath. In some cases it afforded relief; in others it immediately aggravated the dyspnœa.

There are two points in the pathology of asthma which, in reference to the treatment in the paroxysm, deserve much more attention than they have hitherto obtained. These points are, the very general production of the paroxysm by cold, or rather, by "catching cold;" and the identity of the very earliest stage of the disease—that is, the stage preceding the attack of actual dyspnœa—with that of common catarrh. If the invasion of this stage were carefully watched, and means were taken calculated to check its progress, it is not to be doubted that the asthmatic paroxysm might be frequently prevented. In Dr. Ryan's work, this precursory stage of asthma is noticed, and its frequently inflammatory character recognized. But it is in the Essay of Dr. Watt (*Cases of Diabetes, &c.* p. 248) that this important part of the pathology of asthma has had justice done to it, and the principles of treatment to which it leads have been satisfactorily explained. In several cases there recorded, the patients are shown to have been able to recognize the approach of the paroxysm some considerable time before its actual invasion; and by adopting very simple measures "to check the cold," they frequently succeeded in averting the asthma for the time. Those measures were warm pediluvia, warm diluents, and diaphoretics on going to bed, and sometimes purgatives. If these means were followed by evacuations by the skin and bowels, the fit was almost certainly prevented. A circumstance mentioned by one of Dr. Watt's patients is well worthy of notice, as strikingly illustrative at once of the pathology and proper treatment of such cases. If the precursory symptoms of the attack had continued for a number of hours before the patient had recourse to the usual measures, these were found to be now worse than useless. "The bathing and warm drink, which, in the earlier part of the attack, would have prevented the fit, serve now to bring it on sooner and with more violence." I recommend this practice to the particular attention of the profession, convinced from my own experience, as well as from that of the author just named, and from the soundness of the pathology on which it is based, that it will be found of the most essential benefit in asthma. The great uncertainty and lamentable feebleness of our therapeutic means, after the disease is fully formed, enhance extremely the value of any kind of treatment calculated to prevent the invasion of the paroxysm.

II. *Treatment in the interval.*—It will be obvious to any one who considers the pathology of asthma, its different forms and complications, its various causes, and the important modifications derived from difference of constitution in the subjects of it, that the treatment of this disease, in the interval, must vary greatly in individual cases. Practical precepts, which can apply generally, must, on this account, be very brief. They can only have reference to the disease in its simplest state, whether this has been its original character, or has been brought about by the removal of its complications by previous treatment. When called on to treat any case, our first object will be to ascertain its peculiarities; and, having ascertained them, we must regulate our practice accordingly. If the paroxysms of difficult breathing appear to be unconnected with any very marked disorders of the system, except such as are considered to constitute an essential part of the disease, we may then proceed at once to apply the remedies which we consider best suited to the cure of asthma in general. If, on the contrary, we find, as will generally be the case, that the asthmatic affection is complicated with and apparently influenced by some disorder of other parts, it will be wrong to apply any remedies specially directed to the cure of the asthma, until these extraneous disorders are removed, or at least attempted to be removed.

Into these complicating disorders I cannot here enter; and I must content myself with a mere reference to some of the chief remedies applicable to the asthma itself.

Cold bathing.—Of all the means calculated to lessen the morbid sensibility of the bronchial membrane to the impression of cold—in other words, to diminish the tendency in individuals to catch cold—there is none at all comparable to the application of water to the surface of the body, under some form or other of the cold bath. In a climate so cold and variable as that of England, it is utterly vain for those who are unfortunately very liable to catarrhal complaints, to hope, by warm clothing, comfortable rooms, or any plan of seclusion from the atmospheric vicissitudes, to escape them. The very efforts such persons make to avoid the unfavourable influence of the climate only render them more subject to it. Here, as in the case of most other evils, moral as well as physical, the best chance of success consists in strenuous sistance. If we do not positively attack the enemy, we must at least, if we hope for safety, present a bold front and maintain a strong defensive.

It is only by the return to hardier habits generally, and by the practice of cold bathing, that the persons whose cases we are now considering, can hope to re-establish the natural harmony which ought always to exist between the animal and the climate it inhabits, and which in them has been unfortunately destroyed. Cold bathing may be used in various ways; in the form of the common plunge-bath, the shower-bath, or by simple ablution of the exposed surface. In the case of asthmatics, the latter is the mode generally preferable in the first instance, or else the tepid shower-bath. Ablution, when proper, has a very great advantage over all the other forms of bathing, in being attended with little trouble, and being accessible to all. The process consists in simply washing with a sponge, towel, or piece of flannel dipped in water, the trunk of the body, and then drying it, using strong friction at the same time. On first commencing the practice, if in winter, the chill must be taken off the water. A portion of common salt must be always dissolved in it, in the proportion of one or two ounces to the pint, or an equivalent amount of vinegar added. The time for using the water is immediately on getting out of bed; and this is also the best time for using the shower-bath, if the system is sufficiently vigorous to bear the shock without any further preparation.

Tonics.—The special medicines which have been most recommended and used in asthma, belong almost exclusively to the class of tonics. But before proceeding to notice these particularly, I must be permitted once more to caution the practitioner against their indiscriminate use, without due regard to the state of the system. Great discredit has been thrown upon many valuable medicines, and much injury done to asthmatic patients, by premature attempts to cure the disease by means of tonics, and other specific remedies, directed exclusively to act on the nervous system. This is, indeed, the besetting sin of British practice in chronic diseases; and I have good reason to know that asthma forms no exception to a rule too general. Medicines of a kind calculated to act with great power on the organ to which they are primarily applied, are frequently prescribed without any reference to the existing condition of that organ. If general debility prevails, and still more surely, if the stomach refuses to perform its functions with vigour, bitters, bark, steel, are immediately prescribed, with little or no regard to the state of the stomach, although this may be such as altogether to contra-indicate the use of such remedies. While active irritation or chronic inflammation exists in the intestinal mucous membrane, the true tonics are leeches, refrigerants, and low diet; and it is only after the recipient has been prepared by such means, that tonics can be administered without injury even, certainly with any prospect of benefit.

Bark, steel, and the oxide of zinc are the tonics which have been most relied on in the treatment of asthma. The well-earned fame of *bark* in the cure of the periodical affections which originate in malaria, would naturally suggest its employment in a disease like that of asthma; and we find, accordingly, that it has been prescribed and recommended by almost every one who has written on this disease since the introduction of cinchona into European practice. Floyer says, that nothing is more likely to prevent the return of the paroxysm than bark; and that, even in the cases of symptomatic asthma, "though it cannot prevent the fits, yet it greatly relieves the sweats and faintness attending the fits, and headachs, and makes the intervals of the fits longer." Bree recommends it, but less forcibly. He says, it acts as other tonics, and is inferior to steel. Ryan says that "there are few cases that will not admit of its use, particularly if the fits are kept up by habit;" but he adds, that his success with this remedy "has not generally answered his expectations." It does not appear that the observations made on the use of this remedy in the text, are derived from personal experience of the author. The fact appears to be, that bark possesses no specific powers in checking the return of the common asthmatic paroxysm; but that it occasionally acts beneficially in two classes of cases; *first*, when the asthma is complicated with ague, as it sometimes is, and, *secondly*, when the stomach or general system is in a state in which a tonic of this kind is beneficial. If it improves the general health, it frequently aids in the cure or relief of asthma. Steel has been even more extensively used than bark, and, I apprehend, with more general success. In the cases which are attended by that cachectic state of the system indicated by more or less of the pale chlorotic aspect, this remedy is often extremely beneficial, by imparting vigour to the stomach and system generally. Bree is a great advocate for steel, which he considers as preferable to all other kinds of tonics. Floyer's experience, however, both personal and professional, is rather against the use of steel. He says, "most asthmatics complain that steel heats them, stops their stomachs and breaths, and thickens the phlegm, and at last produces a serous effervescence which gives the fit." He says, that both himself and most of his patients were injured by the use of the chalybeate mineral waters, although some were better for them, "the quantity of cool water (as he simply observes) doing more service than the steel could do injury." The fact, no doubt, in this case, as in that of bark, is, that success or failure will depend upon the proper application of the remedy. If the general state of the system seem to indicate the use of steel, and if the state of the stomach and bowels do not forbid it, I have no doubt that it will often prove a valuable remedy in asthma; and the class of cases which are most likely to be benefited by its use, are either those which occur in what may be called the chlorotic temperament, or those which seem allied to neuralgic affections, not dependent on malaria, in which there can be no doubt that steel is often highly useful. But in any case it will be the particular condition of the digestive organs and the general system that will point out the propriety of the remedy, and not any supposed specific powers possessed by it against the asthmatic paroxysm. If it is contra-indicated by the presence of such circumstances as render it useless or injurious in other cases, the addition of asthma to the group will not in any way remove this contra-indication.

Oxyd of zinc has obtained celebrity as a remedy for asthma, chiefly through the publication of Dr. Withers' treatise, in which it is strongly recommended, as possessing extraordinary powers in the cure of this disease. The author records many cases illustrative of its effects. In several it certainly appears to have been beneficial; but, like most promulgators of new or favourite remedies, he has greatly exaggerated its importance as a general remedy. Dr. Withers gave the medicine in doses varying from five to twenty grains twice or thrice a day. This tonic may be given in states of the stomach when bark and steel are inadmissible; and certainly when tonics are indicated, it is entitled to a trial, from the ample evidence adduced in its favour.

The limits of this work will not allow me to notice other remedies or plans of treatment; but I cannot altogether omit reference to the very important point—the effect of climate and regimen. Asthma is one of the diseases in which the effect of change of climate or change of air is most conspicuous. It is the remark of every writer on the disease that certain patients have an increase or alleviation of their symptoms upon changing their residence from one place to another. Sometimes a very slight change, as to distance, has this effect; and even when little or no difference in the nature of the climate or locality can be discovered. According to our present experience these remarkable results can be explained on no general principle; still, attention to the ascertained influence of particular climates on particular diseases, and on the system in general, and a close study of the pathology of the individual cases of asthma, will enable us frequently to be of much service to such of our patients as have it in their power to make choice of their residence.

In selecting a climate for an asthmatic patient, we must be guided precisely by the principles which direct the application of any other remedy or course of treatment. A minute examination of the individual case is always essential; and in making this with a view to the application of climate, we must endeavour to ascertain, 1st. the state of the bronchi; 2d. the state of the general health, or the diseases with which the asthma may be complicated; 3d. the relation, as to the cause and effect, which these diseases bear to the asthma; 4th. the character of the patient's general constitution or temperament; and, lastly, the ascertained effect of particular climates, localities, and seasons, upon his individual case.

Although asthma is a disease of every climate, and although many patients have their severest attacks in summer, there can be no doubt that, in the great majority of cases, a mild and equitable climate is much more favourable to the asthmatic than one that is cold and variable. Such a climate proves beneficial in various ways, more especially in the cases dependent on any form of chronic catarrh. It tends directly to remove the very basis of the disease—1st. by the direct application to the parts of air of a milder and more agreeable temperature; 2d. by rendering the attacks of acute catarrh less frequent, and thereby affording longer intervals for the restoration of the irritated membrane; 3d. by promoting the cure of the accompanying disorders, which frequently exert a most unfavourable influence, both on the structural alteration of the membrane, and on the spasmodic affection of the bronchial muscles; and more particularly the disorders of the digestive organs and the skin; 4th. by enabling the patient to improve the general health and strength, and to fortify the system against the impression of cold by constant exercise in the open air, and by the uninterrupted use of the cold bath throughout the year. (See Dr. Clark's work *On the Influence of Climate in Chronic Diseases.*)

The diet in all chronic diseases is a matter of great practical importance. It is of more especial importance in asthma, because disorder of the stomach is so frequent a concomitant and even a cause of the disease. All the good writers on asthma are strong advocates for moderation in diet; and there is no disease in which patients are more unanimous on the same point. Floyer is particularly zealous against excess both in eating and drinking. " Hunger and thirst (he says) are the best cure for the asthma, especially little and very small drink." " The less the asthmatics are nourished, (he says, in another place,) the longer are the intervals of the fits, and the clearer is their breath." The principles which ought to regulate the diet are few and simple; but the practice must be modified by the circumstances of individual cases. Temperance and moderation are universally applicable and necessary, as is also habitual vigilance against being seduced from the regularity of invalid habits. The particular system of diet is indicated much more by the concomitant affections than by the asthma itself. If the disease is unattended by any very decided disorder of structure in the bronchi, or elsewhere, the diet may be more generous and less strict than under a different state of things. If there is marked affection of the bronchi, with little disorder of other parts, the only circumstance of much importance to be attended to respecting diet, is, that it does not tend, by being over full, directly to increase this bronchial affection, and to induce other disorders which might aggravate the primary disease. But in almost all cases of asthma, we have already other disorders which tend powerfully to aggravate and keep up the bronchial affection, and in the alleviation or cure of which diet is of paramount importance. In this list we may include dyspepsia with its numerous progeny of general and local diseases, plethora, gout, gravel, diseases of the mucous membranes generally, of the liver, brain, uterus, skin, &c. &c. For the dietetic management of these diseases we must refer the reader to the particular authors who treat of them, and to the various treatises on regimen and diet; we would only here observe that the co-existence of the asthmatic paroxysm scarcely, in any degree, alters the diet proper in these affections.

LITERATURE OF ASTHMA.

1698. Floyer (Sir J., *M.D.*) A Treatise of the Asthma. *Lond.* 8vo.
1703. Ridley (H., *M.D.*) Observationes de Asthmate, &c. *Lond.* 8vo.
1769. Millar (J., *M.D.*) Obs. on Asthma and Hooping Cough. *Lond.* 8vo.
1770. Rush (Benj., *M.D.*) A Diss. on the Spas. Asthma of Children. *Lond.* 8vo.
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1793. Ryan (Mich., *M.D.*) Obs. on the Hist. and Cure of Asthma. *Lond.* 8vo.
1795. Davidson (W.) Obs. on the Pulmonary System, &c. *Lond.* 8vo.
1797. Bree (R., *M.D.*) Pract. Obs. on Disordered Respiration. *Lond.* 8vo.
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1804. Laubender (B.) Ueber die erkenntniss, &c. der Engbrustigkeit. *Nurn.* 8vo.
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1811. Phillips (Sir R.) Communications on Stramonium in Asthma. *Lond.* 12mo.
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1821. Guersent. Dict. de Méd. (Art. *Asthme Aigu.*) t. iii. *Par.*
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1829. Jolly. Dict. de Méd. et de Chir. (Art. *Asthme.*) t. iii. *Par.*
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Transl.

BOOK THIRD.

DISEASES OF THE PLEURA.

CHAPTER I.

OF PLEURISY.

Pleurisy, or inflammation of the pleura, derives its name from the pain of the side, which is usually its principal symptom. The word *πλεύριτις* in the sense in which it was used by Hippocrates, properly speaking, signifies every kind of pains in the side, particularly such as are of considerable violence, continued, and accompanied with acute fever. This circumstance, and the small progress made by pathological anatomy before the end of last century, gave occasion to many controversies respecting the true characters and the seat of pleurisy; some considering it as an inflammation of the pleura, some as an inflammation of the lungs, others as having its seat in both these, or sometimes in one and sometimes in the other; while some looked for its cause in the cellular adhesions which so frequently unite the lungs to the pleura of the ribs. At a recent period we still find these questions discussed at length, and very unsatisfactorily decided, by Morgagni, who may be considered as the father of pathological anatomy;* as well as by Sarcone, who was perhaps the most remarkable practitioner of the last century.† More recently still, one of the oldest and most celebrated physicians of our time, considered the subject under the same point of view.‡

These questions are now obsolete, at least in France, where the term pleurisy, ever since the publication of M. Pinel, has been restricted to signify inflammation of the pleura. It is, no doubt, true that pleurisy and pneumonia are very frequently combined; that, in cases where the pleura alone is inflamed, the stitch of the side, which constitutes the principal character of the *πλεύριτις* of the ancients, and also of many moderns, is scarcely perceptible or only momentarily, and in certain cases is altogether wanting; and, on the other hand, that in cases where a violent pneumonia is complicated with a very slight pleurisy, there is sometimes a most violent pain of the side: at the same time, it is equally certain that one of these inflammations may exist without the other, and that there are even certain epidemic constitutions in which they are commonly found distinct. In every case, the nomenclature adopted in this work, being founded on the difference of organs and not of symptoms, can lead to no confusion: with us, the term *pleurisy* will always signify inflammation of the pleura, whether it is attended by a stitch or not; *peripneumony* or *pneumonia* will always stand for inflammation of the lungs, even when accompanied by acute pain of the side, while *pleuro-pneumonia* will indicate the co-existence of inflammation in both organs. In this chapter I shall consider the pathology and treatment of pleurisy under the following heads: —1. simple acute pleurisy; 2. acute hæmorrhagic pleurisy; 3. chronic pleurisy; 4. contraction of the chest, consequent to pleurisy; 5. circumscribed or partial pleurisy; 6. latent pleurisy; 7. pleuro-pneumonia; 8. empyema.

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* Epist. xx. 38. Epist. xxi. 37, et seq.

† Istor. ragion. de' mali in Napoli. *Napoli*, 1765.

‡ Mém. de l'Acad. des Sciences, 1789. *Observation qui prouve*, &c. par Portal.

SECT. I.—*Of simple Acute Pleurisy.*

The anatomical characters of pleurisy are drawn from the state of the pleura, and the alteration and augmentation of the secretion which always accompanies the inflammation of this, as of all serous membranes.

The pleura in the state of acute inflammation presents a punctuated redness; as if one had traced with a pencil upon the pleura, an infinity of small bloody spots of very irregular figure, and very close to one another. These red points occupy the whole thickness of the membrane, and leave small intermediate portions retaining the natural white colour. It cannot be doubted that, during life, the redness was uniform; and that the punctuated appearance as well as the natural colour of the greater part of the membrane, observed after death, are, according to the remark of Bichat, owing to that anatomical disposition of parts, which frequently occasions the almost total disappearance of the redness of erysipelas after death. Besides this particular redness,—and even in those instances where it is very inconsiderable,—we always find the superficial blood-vessels of the pleura redder, more distinct, and more distended than in the natural state. Many consider the thickening of the pleura as a very common consequence of inflammation. I must say, however, that I never clearly perceived this; and I think there can be no doubt that, in the greater number of cases wherein it had been thought to exist, the supposed thickening has either been

different matters : the one of a firmer, semi-concrete c
is usually termed *false membrane ;* the other, very
watery, is called *serosity* or *sero-purulent effusion.*
these exhibit great varieties of character.

The *false membranes* consist of a yellowish-whit
or slightly semi-transparent matter, varying from the
of a thick pus to that of boiled white of egg, or of
coat of the blood, to which last substance, indeed, th
titious membranes bear a strong resemblance in all the
characters. This substance closely invests the whol
portion of the pleura, following it, when the inflan
general, through its whole course, as well on the lung
chest, and forming a sort of complete inner lining of
the inflammation is confined to either the pleura pul
costalis, the inflamed portion is alone covered by the
brane. In cases of extensive inflammation, very freq
portions of false membrane covering the lungs and cos
are united by bands of the same, which extend from
other through the serous fluid effused into the cavity.
cases, the false membrane adheres but slightly to t
being readily separable by the handle of the scalp
membranous exudations commonly vary in thickness f
line to two lines ; for the most part they are of unif
ness, though, occasionally, they are thicker in some p
cially on the lower face of the lung, and the correspon
of the diaphragm. In some instances, there are par
tions, or thickenings, of the membrane throughout
extent, in the form of lines which cross each other
exhibit a sort of irregular net-work. Sometimes th

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* This is doubted by other pathologists. In the article *Pleurisy*, in t
of Practical Medicine, Dr. Law makes the following comment on th
Laennec :—" Although in the larger cavities, viz. the abdomen,

elevations are so close together, as to give to the membrane the appearance of being studded or granulated with small irregular tuberosities. In both these cases, the intermediate points remaining comparatively thin and diaphanous, when contrasted with the elevated portions, give to the membrane an appearance very similar to the omentum when moderately loaded with fat. This resemblance is particularly striking after the formation of blood-vessels in it.

Occasionally, and particularly when the effused fluid is in large quantity, the false membranes become separated from the pleura, either wholly or in part, and float loosely in the serum. We sometimes even find pretty large masses of this kind, of an irregular roundish shape, and looking as if they had never been attached at all to the pleura. This, however, appears to me inconceivable; and it seems probable that these bodies had been originally formed in the angular parts of the cavity of the pleura, at the origin of the diaphragm, or roots of the lungs, and had acquired their globular forms after their separation.

The serous effusion which attends the formation of false membranes, is commonly of a lemon, or light yellow, colour, transparent, or with its transparency only slightly disturbed by the intermixture of small fragments, or filaments, of a concrete pus, or pseudo-membranous substance. In the latter case, it very closely resembles unstrained whey. This resemblance is so great, that some practitioners have really fancied that they discovered milk itself in the sero-purulent effusion of puerperal peritonitis: and truly, such a mistake might be pardonable, did we not find an effusion exactly similar in the inflammatory affections of all serous membranes, and in men as well as women. The effused fluid is generally without any smell in the acute pleurisy. I have found it fetid only in a single instance, in the case of a man who died of pleuro-pneumonia, after imperfect poisoning by opium. In this case, the serosity and false membranes had a sharp vinous odour, extremely nauseous. The relative proportions of the effused serum and albuminous extravasation, are not at all fixed. Sometimes the serum is extremely abundant, and the membranous exudation very small, and *vice versa*. Generally speaking, the more violent the inflammation, the more extensive and thick is the membranous exudation. In weak leucophlegmatic subjects, on the contrary, we find a great quantity of limpid serum, with a small portion of thin membrane often floating in it. In such cases, the pleurisy seems to pass insensibly into hydrothorax, as we shall see more particularly hereafter. In general, the more limpid is the serum, the less is the quantity of albuminous exudation; a circumstance to be expected, since the small fragments that render it turbid are derived from this. In some rare instances, we find a pseudo-membranous exudation uniting the contiguous surfaces of the pleura, end of this time that it becomes too manifest to be overlooked, from the dilatation of the affected side, and the total absence of sound on percussion. I am, however, convinced that the effusion of serum is contemporaneous with the inflammation, in all serous membranes.

It is the character of the false membranes produced in pleurisy to be changed into cellular substance, or rather into a true serous tissue, like that of the pleura: and this is the natural progress of the process when left quite undisturbed. This change is produced in the following manner: the serous effusion which accompanied the membranous exudation is absorbed, the compressed lung expands, and the false membranes investing it and the costal pleura, become united into one substance. By and by, this substance becomes divided into layers, pretty thick and opaque, which are separated by a very small portion of serosity. About this time blood-vessels begin to make their appearance in it, the first rudiments of which have the aspect of irregular lines of blood, much larger than the vessels which are to take their place. The blood seems as if it had been forced into the substance of the false membrane by a strong injection; and we find the corresponding portions of the pleura redder than elsewhere, and, as it were, spotted with blood. After a time, the pseudomembranous layers become thinner and less opaque; the lines of blood assume a cylindrical shape, and ramify in the manner of blood-vessels, but still preserving their augmented diameter. On minutely examining these at this stage, we find their external coat consisting of blood scarcely yet concrete, and very red; within this there is a sort of mould, or rounded substance, whitish and fibrinous, and formed evidently of concreted fibrine, perforated in its centre, already permeable to the blood, and evidently containing it. Eventually the layers of the false membrane become quite transparent, and nearly as thin as those of the ordinary cellular tissue; and the blood-vessels resemble, in every respect, those which ramify on the inner surface of the pleura. It wants, however, the firmness of the natural cellular substance, being easily torn in our attempts to examine it; its vessels still retain the large diameter indicative of their recent formation; and it requires some considerable time for them to attain the perfect character of the original tissues of the body. These productions are not homogeneous; they consist of many folds, which are united together by surfaces which are cellular, like the outer surface of the pleura, and which contain the vessels; while their exterior surface is smooth, shining, and evidently exhalent, like the inner surface of the pleura to which they adhere. I have sometimes, though very rarely, met with portions of fat in the duplicatures of these bodies. These accidental productions have, for the most part, a direction perpendicular to the surfaces whereon they originate; that is to say, the line of their direction, heat, or occasional slight and transient pricking pains, are the only indications of such an affection in cases of consumption.

Since the publication of the first edition of this work, too much importance appears to me to have been given to these cases of *dry pleurisy*, in some recent works, journals, and theses. I am even doubtful whether any pleurisies exist, in which there is simple secretion of a false membrane, without any tendency to serous exhalation at the same time. All the cases mentioned may be reduced to two kinds,—that in which the effused serum has been absorbed before death, and that in which its exhalation has been mechanically prevented by an indurated lung. In respect of the first kind, we know how rapidly absorption takes place in certain cases. M. Guersent informs me, that he has found these dry pleurisies more frequently in children than in adults; and we know that absorption is much more rapid in this period of life. In regard to the second class of cases, I would observe, that compression is one of the most powerful means for promoting absorption; and that in instances of pneumonia arrived at the stage of hepatization, in tuberculated lungs, and in cases of pretty close adhesions between the lungs and pleura, existing previously to the pleuritic affection, if serous exhalation took place, it would probably be re-absorbed immediately. In all these circumstances, at least, if we find serum as well as false membranes, the former is always in small quantity. Andral (Cl. Méd. t. ii.) relates three cases which he considers as examples of dry pleurisy; but as they were all cured, we cannot be certain that they were not cases of simple pleurodyne.*

I think it necessary to notice in this place a common error respecting the period at which the pleuritic effusion takes place. Many physicians imagine that it does not occur till after a certain time, and even some days; and it is this notion, no doubt, which has given rise to the common expression of *pleurisy terminated by effusion*. These opinions are incorrect. I have several times observed all the physical signs of effusion,—that is, ægophony and absence of the respiration and sound on percussion,—in the course of one hour after the invasion of the disease, and I have seen the side manifestly dilated at the end of three hours. On the other hand, I do not remember to have met with a single case in which the effusion was doubtful (under the stethoscope) during the first and second day, and distinct in the succeeding days. The utmost that we can admit on this point is,—that the effusion continues to increase for several days, and that it is only at the end of this time that it becomes too manifest to be overlooked, from the dilatation of the affected side, and the total absence of sound on percussion. I am, however, convinced that the effusion of serum is contemporaneous with the inflammation, in all serous membranes.

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* M. Andral imagines that we might recognize the dry pleurisy by means of the diminished intensity of the respiratory sound, occasioned by the impediment to the free dilatation of the chest, made by the pain; but he seems to forget that this impediment would not exist, if there happened to be no stitch, and that it would be found equally in the rheumatic pleurodyne; and, moreover, it has been proved by many facts, formerly stated, that the intensity of the respiratory sound is far from being always proportioned to the degree of dilatation of the thorax.—*Author.*

It is the character of the false membranes produced in pleurisy to be changed into cellular substance, or rather into a true serous tissue, like that of the pleura: and this is the natural progress of the process when left quite undisturbed. This change is produced in the following manner: the serous effusion which accompanied the membranous exudation is absorbed, the compressed lung expands, and the false membranes investing it and the costal pleura, become united into one substance. By and by, this substance becomes divided into layers, pretty thick and opaque, which are separated by a very small portion of serosity. About this time blood-vessels begin to make their appearance in it, the first rudiments of which have the aspect of irregular lines of blood, much larger than the vessels which are to take their place. The blood seems as if it had been forced into the substance of the false membrane by a strong injection; and we find the corresponding portions of the pleura redder than elsewhere, and, as it were, spotted with blood. After a time, the pseudo-membranous layers become thinner and less opaque; the lines of blood assume a cylindrical shape, and ramify in the manner of blood-vessels, but still preserving their augmented diameter. On minutely examining these at this stage, we find their external coat consisting of blood scarcely yet concrete, and very red; within this there is a sort of mould, or rounded substance, whitish and fibrinous, and formed evidently of concreted fibrine, perforated in its centre, already permeable to the blood, and evidently containing it. Eventually the layers of the false membrane become quite transparent, and nearly as thin as those of the ordinary cellular tissue; and the blood-vessels resemble, in every respect, those which ramify on the inner surface of the pleura. It wants, however, the firmness of the natural cellular substance, being easily torn in our attempts to examine it; its vessels still retain the large diameter indicative of their recent formation; and it requires some considerable time for them to attain the perfect character of the original tissues of the body. These productions are not homogeneous; they consist of many folds, which are united together by surfaces which are cellular, like the outer surface of the pleura, and which contain the vessels; while their exterior surface is smooth, shining, and evidently exhalent, like the inner surface of the pleura to which they adhere. I have sometimes, though very rarely, met with portions of fat in the duplicatures of these bodies. These accidental productions have, for the most part, a direction perpendicular to the surface whereon they originate; that is to say, the line of their direction from the opposite points to which they are attached, forms, in general, nearly a right angle with the pleura. After having attained this stage, whatever may be their extent, they do not, in general, affect the health; the respiration even, except in some particular cases, does not suffer from their presence. They possess, in fact, all the characters of the natural serous tissues, being capable of exhalation and absorption like them, and often containing, in cases of dropsy, a considerable quantity of effused serum. Sometimes they even inflame, and, in this case, become invested by false membranes, similar to what they themselves had originally been. This is, however, very rare; and it would even seem that a severe pleurisy, which has terminated by numerous adhesions, renders the part so affected much less liable to an attack of the same disease, than a sound part. I have only hitherto met with eight or ten instances of inflammation of these adventitious membranes, although nothing is more common than to find the lungs completely adherent to the costal pleura. It is even found that, in cases of a second attack of pleurisy in a person whose lungs adhere to the pleura from the effects of the first, the inflammation, albuminous exudation, and sero-purulent effusion, do not invade the adherent parts: insomuch that we may lay it down as a principle, that the severer has been an attack of pleurisy, the less likely is a return of the same disease.

The conversion of albuminous exudations into cellular substance has only been thoroughly understood for a short time, although the observation of the fact is of very ancient date. Hippocrates was acquainted with the pulmonary adhesions;* Diemerbroeck imagined that they must be the product of inflammation and ulceration;† Boerhaave considered them as the consequence of pleurisy.‡ Some observations of Stoll§ indicate a more perfect knowledge of the conversion of false membranes into cellular substance; and yet, about the same time, we find Morgagni, after having collected and collated the testimonies and opinions of authors, still uncertain respecting them, and inclined towards the ridiculous notion of Vernojus, who considered them as the effect of laughing.‖ At a still more recent date, one of the most distinguished professors of the Faculty of Medicine of Paris, imagined them to be the result of some sort of disorganization of the pleura.¶ The extensive investigations in morbid anatomy made over the whole of Europe, and particularly in France, during the last thirty years, leave now no doubt upon this subject. One remarkable circumstance relative to these adhesions is, that although the concrete pus when first thrown this character from the very beginning, in some cases becomes so only during the course of the disease, and particularly at the time when the blood-vessels begin to be formed in the false membranes; in which case, the hæmorrhage is a mere excess or aberration of the restorative operations of nature. These two varieties may sometimes be distinguished in practice: the primitive hæmorrhagic pleurisy being remarkable from the very beginning for the severity of the signs of effusion; while the other only assumes this character, more or less suddenly, in the course of the disease, and after a delusive appearance of convalescence. Generally speaking, in the hæmorrhagic, the effusion of fluid is more abundant than in the simple pleurisy. In the former, also, the tendency to absorption is much less, and the cure, when it takes place, much more protracted. This is the case which most commonly constitutes the acute empyema, of which I shall have occasion to speak hereafter.

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* De Morb. lib. ii. *Pulmo ad latus prolapsus*; also Lib. de Locis.

† Anat. lib. ii. cap. 13.

‡ Prælect. ad Instit. sect. 606.

§ Rat. Med. pars v. p. 5. 16, 228, et seq. p. 243. 255. 261. 397; pars vii. p. 210.

‖ Epist. xvi. lib. ii. sect. 16.

¶ Journ. Gén. de Médécine, t. xx. p. 68.

It is chiefly, and perhaps solely, in cases of hæmorrhagic pleurisy, that we meet with a peculiar transformation of the false membranes, very different from that described above. In these cases, and perhaps also in some others in which the effusion has been of long continuance, the false membranes investing the lungs and pleura acquire a particular hardness, a sort of bluish semi-transparency, and an incipient fibrous or cartilaginous organization.* After this, they are no longer susceptible of conversion into the adventitious serous tissue. When the effusion is absorbed, the lung, long compressed by it, and further bound down by the strong false membrane just described, which completely invests it, cannot dilate itself promptly enough to keep pace with the progress of the absorption; the ribs, consequently, contract, and the cavity of the chest is thus diminished. When the fluids are completely absorbed, the costal and pulmonic exudations come into close contact and finally unite, so as to form only one substance. The consistence of this becomes daily firmer, and, after a few months, acquires the consistence and all the other characters of a fibrous or fibro-cartilaginous membrane. If we dissect carefully this species of membranous production, we find that, although it adheres closely to the pleura of the ribs and of the lungs, it can be detached from these almost entirely. If we cut it transversely, we find it composed of three different layers; two exterior, which are opaque, white, almost completely fibrous, sometimes cartilaginous and even ossified in certain points; and one intermediate, which is semi-transparent, and resembling, in every respect, the central and most transparent portions of the intervertebral cartilages. This last layer is evidently the medium of union between the two others. Although it be obviously a posterior production, and can only have taken place after the

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* See a case of this kind in "Original Cases, &c. by John Forbes, M.D." p. 247. —*Transl.*

Partial pleurisies, as we shall find, present still more remarkable deviations from the common course.

Sect. II.—*Of Acute Hæmorrhagic Pleurisy.*

By this name I wish to designate the re-union of hæmorrhage (usually slight) with inflammation of the pleura. This case, which is by no means rare, differs from the simple acute pleurisy, not merely in its pathological character, but even as to its progress and treatment. The effused serum is more or less tinged with blood; commonly the quantity of blood is very small; sometimes, besides that dissolved in the serum, there are found some small coagula of it. It is very unusual for the proportion of blood to be so great as to give to the effusion the appearance rather of a very liquid blood than of an admixture of blood and serum; and it is equally unusual to find the coagula large or numerous.* In the cases where this occurs, and which constitute what the ancients called *sanguineous empyema*, the hæmorrhagic affection evidently controuls the inflammatory; the coagulable lymph is secreted in much smaller quantity than in common pleurisy, and the false membranes are thin and sometimes cover only a small portion of the pleura. In the more common cases, in which the serum is merely tinged with blood, the false membranes remain usually white, yellowish, or colourless, on their attached surface, over a great part of their extent. Here and there, however, they are deeply charged with blood, as well as the corresponding points of the pleura; and indeed this membrane, throughout, is commonly much redder than in simple pleurisy. It is very uncommon for the bloody patches just mentioned, to extend beyond the adherent surface of the false membranes; sometimes, however, these are coloured in this manner through their whole thickness but only over a small space. It is much more common to find (even in cases where the serum is only slightly coloured) the whole external or unattached surface of the false membranes, of a scarlet or somewhat bluish colour: and this happens, although there may only be comparatively few red spots on the adherent surface of the false membrane, and although the interior of this retains its natural whiteness. It is necessary to remark in this place, in respect of the deepness of colouring of the patches, particularly those found on the adherent surface of the membranes, that it is certainly heightened by transudation after death, as will be more particularly noticed when we come to treat of the diseases of the aorta. It appears to me certain, from the collation of the results of many cases, that the hæmorrhagic pleurisy, although frequently possessing this character from the very beginning, in some cases becomes so only during the course of the disease, and particularly at the time when the blood-vessels begin to be formed in the false membranes; in which case, the hæmorrhage is a mere excess or aberration of the restorative operations of nature. These two varieties may sometimes be distinguished in practice: the primitive hæmorrhagic pleurisy being remarkable from the very beginning for the severity of the signs of effusion; while the other only assumes this character, more or less suddenly, in the course of the disease, and after a delusive appearance of convalescence. Generally speaking, in the hæmorrhagic, the effusion of fluid is more abundant than in the simple pleurisy. In the former, also, the tendency to absorption is much less, and the cure, when it takes place, much more protracted. This is the case which most commonly constitutes the acute empyema, of which I shall have occasion to speak hereafter.

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* A case of this kind, however, is recorded by Andral, *Clin. Méd.* t. ii. obs. xv.—*Author.*

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* See a case of this kind in "Original Cases, &c. by John Forbes, M.D." p. [illegible] —*Transl.*

SECT. III.—*Of Gangrene of the Pleura, and of the false Membranes consequent to Pleurisy.—Perforation of the Pleura.*

Gangrene of the pleura is a very rare disease; it is hardly ever general, or even of any considerable extent. It is as seldom a primary affection; and I have only met with one case where it appeared to be a termination of the acute inflammation. Most commonly it is the consequence of the bursting of a gangrenous abscess of the lungs into the pleura, and occasionally it supervenes to chronic pleurisy. The affected parts present the appearance of soft gangrenous spots, of a brownish or blackish green, round or irregular, and often not extending beyond the pleura. When these gangrenous patches have been removed by the softening down of their substance, the borders of the ulcers left behind remain blackish for a long time. Sometimes the parts beneath the pleura are affected to a very small depth; and almost always the subjacent cellular substance becomes greenish, and filled with serum to some distance around the eschar. In some instances, the intercostal muscles, the neighbouring portions of the lung, and even the ribs, participate more or less in the disease; and all exhale the gangrenous fetor. A general inflammation of the pleura, and the consequent formation of false membranes to a great extent, and a copious effusion, always follow gangrenous affections of the pleura, if these are not themselves the consequence of an old pleurisy. In every case, the false membranes, whether old or new, put on the gangrenous character in a greater or less degree. This is particularly observable in the case of a gangrenous abscess bursting into the pleura. Only once have I found this state of the pleuritic membranes, in a case in which there were, at the same time, some gangrenous cavities in the lung, half filled with a greyish and horribly fetid sanies. None of these excavations communicated with the cavity of the pleura, and yet this contained half a pint of a fluid precisely similar, only somewhat thinner. This fluid, which occupied the lower part of the right side, was contained in a soft half-putrid membrane of a brownish grey colour, and of a strong gangrenous fetor. It is evident that, in this case, the gangrene of the false membrane was the effect of a general condition of the system.

It sometimes happens, in chronic pleurisy, that a gangrenous eschar forms on the pleura, and permits the effused fluids to moment of the exhalation of blood necessary for the formation of the vessels, a certain quantity of fibrine becomes intermixed with the albumen which composed the false membrane in the first instance, and thus disposes it to be converted into fibrous or cartilaginous tissue. This mode of formation is proved to me by many cases in which I have found them of every degree of consistence. In every instance of acute pleurisy that has come under my notice, which has become chronic in consequence of attendant hæmorrhage, I have always found the attached portion of the false membranes much more consistent than the superficial parts, and in a more or less advanced stage of the fibro-cartilaginous transformation. Even when this deeper layer was softer, it presented an appearance, in some sort, intermediate between those of the fibrine of the blood, the fibrinous coat of the arteries, and the common albuminous false membranes.*

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* Dict. des Sc. Méd. *Cartilages Accidentels.*

The possibility of this admixture of the fibrine of the blood, or of blood itself, with the pseudo-membranous albumen, for the formation of the adventitious membranes in question, is supported by several analogies. We observe not only on the pleura, but on other serous membranes, pseudo-membranous exudations strongly impregnated with blood, or even composed of layers of half-concrete albumen and coagulated blood. The false membranes which we sometimes find after chronic peritonitis, stained of a violet, brown, or ochre-yellow colour, appear to me to have the same origin; and if we compare the exudation which produces *callus* in cases of fracture, with several analogous facts of morbid anatomy, we shall find it extremely probable, that the exudation of fibrine is as necessary for the formation of a bony, fibrous, or cartilaginous tissue of an adventitious kind, as the exudation of albumen is necessary to the development of the serous tissue which forms the *serous* adhesions subsequent to pleurisy or other inflammations of serous membranes.—These fibro-cartilaginous membranes have been commonly described under the name of *thickenings* of the pleura; and this is a mistake very likely to be committed by those who trust to their mere appearance, without further examination. On dissecting them, however, we can always separate them from the pleura, which is found of its natural thickness. We must not confound these membranes with the fibro-cartilaginous incrustations of a like nature, which are sometimes formed on the exterior or adherent surface of the pleura, and which I have described elsewhere.*

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* I am doubtful of the propriety of separating the form of pleurisy described in this section, from that described in the preceding; and I am led by my own experience to be more than doubtful of the correctness of our author's opinion, that it is almost exclusively in this variety that the contraction of the chest occurs. Indeed, I think it will appear, from many expressions in this and the subsequent sections, that M. Laennec's own experience was incompatible with this statement I have the satisfaction to find that M. Chomel (Dict. de Méd. t. xvii. p. 140) agrees with me in this opinion. It is proved by chemical analysis, (Andral, *Précis*, t. i. p. 479,) that the false membranes, termed albuminous, by Laennec, contain fibrine. The hæmorrhagic pleurisy is briefly noticed by Broussais (Phleg. Chron. t. i. p. 342-3).—*Transl.*

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It sometimes happens, in chronic pleurisy, that a gangrenous eschar forms on the pleura, and permits the effused fluids to escape through the intercostal muscles, so as to be finally evacuated, either naturally or artificially, and that the empyema is thus cured. This species of abscess has been long known; and its puncture constitutes what is commonly called *empyema from necessity*. It is, however, very rare: M. Recamier has only seen it twice; and I have only met with one case of it. Besides gangrene of the pleura, nature has one other way of evacuating externally, the sero-purulent effusion of the chest; this is by the formation of an abscess between the layers of the intercostal muscles, or between these muscles and the skin, which, bursting both externally and internally, affords a passage for the discharge of the contained fluids. I have only met with a single case of this kind. Andral, however, gives two cases of it;[*] one from his own experience, the other observed in England. A cure has, perhaps, more frequently followed the evacuation procured by means of these kinds of abscesses, than that of the artificial empyema. This, however, is not always complete, as it is common for the disease to degenerate into an incurable fistula, which is frequently kept up by a carious state of the neighbouring ribs.

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* Dict. des Sc. Méd. *Cartilages Accidentels.*

It is still more usual for these collections of matter to be evacuated into the bronchi. The ancient physicians considered the rupture of an abscess of the lungs into the pleura, as a common cause of empyema; but they do not appear to have suspected the possibility of the reverse of this. I believe Bayle to have first clearly proved this. It scarcely ever occurs but in chronic pleurisy; although Andral relates a remarkable case of it in the acute disease. (Cl. Méd. t. ii. Obs. xxxvi.)[†]

SECT. IV.—*Of the Signs and Symptoms of Acute Pleurisy.*

Physical signs.—As soon as the effusion takes place, the natural sound of the chest, on percussion, fails over the whole space occupied by the fluid. From this result simply, we could not indeed be certain whether the disease is pleurisy or pneumonia, although the common symptoms, general and local, must assist us in making the distinction. Under these circumstances, I have seen physicians endeavour to obtain a mark of distinction between the two diseases, by placing the patient in different positions; and I have myself made a like experiment, but without any satisfactory result. This might be expected, since the chest is always full; and fluids change place by position, only in a vessel that is more or less empty: in the chest, the extravasated fluid can only change its position by compressing the lung. It is true, that when the effusion is inconsiderable, it tends to the posterior or inferior parts of the chest, (when the patient lies on the back,) on account of its being heavier than the lungs; but if it exists in considerable quantity, it diffuses itself over the whole surface of the lungs, except in the points where old adhesions exist.* To these natural impediments to change of position of the extravasated fluids may be added, the increased fixedness of the lungs from the compression of their substance by the effusion, and from the presence of old adhesions; besides, even if this motion of the fluids were practicable, the frequent co-existence of pneumonia would often render the result of percussion of no value, as a mark of discrimination. The great extent of surface over which the sound is wanting, is, however, a much more certain and practical indication: in the case of pleurisy, it frequently happens, that, in the course of a few hours from the attack, the dull sound exists over the whole affected side, or, at least, over its lower half,—a thing which is never, or almost never, observed in pneumonia. But mediate auscultation furnishes us with much more certain means of discriminating these two diseases, and enables us to ascertain with precision, not merely the existence of the effusion, but its quantity. The signs by which the stethoscope effects this, are, 1st, the total absence, or great diminution, of the respiratory sound; and, 2nd, the appearance, disappearance, and return of *Ægophony*.

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[*] Andral gives *three* cases of it, viz. one from the Italian Journals, besides the two noticed in the text. In cases of chronic pleurisy, the escape of the matter through the walls of the chest is by no means very uncommon. I have myself met with more than one instance of it.—*Transl.*

[†] Many instances of this mode of escape of the pus in chronic pleurisy are on record. I have myself met with a case of the kind, and have had several undoubted instances related to me by practitioners. Broussais gives two cases of gangrenous perforation of the pleura pulmonalis in chronic pleurisy; and another in which the communication seems to have taken place from simple ulceration. Phleg. Chr. t. ii. p 290. 297. 301.—*Transl.*

When, as is often the case, the pleuritic effusion is very copious from its very commencement, the sound of respiration is then totally absent through the whole of the side affected, except in a space of three fingers' breadth along the vertebral column, where it is still heard, though less strongly than on the other side. This complete disappearance of respiration after the existence of disease for a few hours, is quite pathognomonic of pleurisy with copious effusion, whether there exists pain in the side or not. In pneumonia, the disappearance of the respiration is gradual, and is perceived to be unequal in different parts of the chest; it is scarcely ever quite wanting below the clavicle; and when this takes place, it is not till after some days, or even weeks. It is, further, preceded, for twenty-four or thirty-six hours, by the crepitous rhonchus, which is quite characteristic. In pleurisy with copious effusion, on the contrary, the loss of the respiratory murmur is sudden, equable, uniform, and so complete, that no effort of inspiration can render it perceptible. The continuance of the respiration along the spinal column is an equally constant sign. This exists equally in the chronic disease, attended with the most copious effusion; and even in cases wherein, on examination after death, the lungs are found so much compressed, as to be discovered with some difficulty. The thing is explained by the compression of the lungs backwards towards their roots. In many cases, the respiration still continues to be perceived immediately under the clavicle, when all the other signs announce the existence of a large effusion; a circumstance which is explained in such cases, by the presence of old adhesions in that spot. But when the same thing is observed when the extravasation is moderate, we can only infer, either that the fluid does not reach so high, or covers the upper lobe with a very thin layer. In these cases of sudden and complete cessation of the sound of respiration, we must not imagine that, although extensive, the extravasation is so abundant as it is in many cases of chronic pleurisy, in which we find the lungs completely flattened against the mediastinum. In the instances now under notice, it would seem, that the lung is suddenly choked, as it were, and ceases to admit the air in respiration, although it has hardly yet lost one-fourth of its volume, and is only slightly compressed. And it frequently happens, after the lapse of a few days, that the lung becoming habituated to the pressure, recommences its functions; so that we again can hear the sound of respiration in some points, although the effusion continues undiminished, or even is somewhat increased. This fact I have more than once proved by dissection, and by the comparison of the signs of auscultation and *mensuration* of the chest, of which last I shall presently have occasion to speak. These copious and sudden effusions occur chiefly in old persons, or in adults of weak and cachectic habits, and in the hæmorrhagic pleurisy. The sudden and complete cessation of the respiration in such cases, must, therefore, be considered as affording a very bad prognostic; as we may be assured that the conversion of the false membranes into cellular substance, and the absorption of the effusion, will take place either not at all, or imperfectly, and the disease will soon pass into the chronic state. In children and persons of a good constitution, the effusion becomes scarcely ever so suddenly abundant.

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* The experiments and observations of Piorry, Reynaud, and others, appear to render more than doubtful, the correctness of Laennec's opinion respecting the immobility of the fluid effused in pleurisy, from change of the position of the body. In fact, the very circumstance of the effused fluid being of greater specific gravity than the air-filled pulmonary tissue, renders the change of position of the fluid an inevitable consequence of the change of posture, in many cases at least.—*Transl.*

After some hours, or even days, the respiration is still perceptible over the whole affected side; and even more distinctly than we might be led to expect from the imperfection of the sound on percussion. It is, however, much less than on the healthy side; and is without any rhonchus, except in the rare case of a catarrhal complication. If the effusion increases, the respiratory sound becomes less; it then appears to be heard more remotely, and finally disappears entirely, except at the root of the lungs, where it always is more or less perceptible. The decrease of the resonance from percussion, does not by any means preserve this regular progression; the sound being usually as dull at the period when the respiratory murmur is merely diminished, as when it has entirely ceased. When the pleuritic effusion is at all considerable, the respiration only becomes *puerile* on the sound side. It even sometimes happens that this puerile respiration is transmitted through the effused fluid, and is perceived over the whole extent of the diseased side. To prevent this being mistaken for respiration existing in the affected parts, we must explore the whole of these, and we shall then find that the sound becomes louder the nearer we approach the other side. Besides, the quality of the sound, its distance and its clearness, indicate its real site; and this may sometimes be further demonstrated by a momentary compression of the healthy side, which will cause it to cease. But exclusively of these, the other signs afforded by ægophony, percussion, and mensuration, prevent any misconception, respecting the effusion. This particular case is, moreover, uncommon, and only occurs in the chronic disease.*

When the effusion begins to diminish, by absorption, this is first observable by the augmented intensity of the respiratory sound along the side of the spine, where it had never quite disappeared. Shortly after, it is perceptible on the anterior-superior part of the chest, and top of the shoulder; and in a few days it returns below the scapula, and at last gradually re-appears, successively, on the side, and the lower part of the chest before and behind. Wherever there are adhesions between the lungs and pleura, of any considerable extent, the respiration continues audible over them, in a greater or less degree, throughout the whole period of the effusion; and the commencement of the absorption is perceived by the augmented intensity of sound in these places, and in the summit and anterior border of the lung, which parts had been but little affected. The return of the respiratory sound is much more slow in pleurisy than pneumonia. Sometimes, and particularly in cachectic subjects, it is weeks and even months, after the re-appearance of it near the clavicle, before it is perceptible in the inferior parts of the chest; and often for months after the convalescence of a patient, it is only one-half so distinct in the affected side as in the sound one. This is owing, I conceive, partly to the very slow process by which the false membranes are converted into cellular substance, and partly to the diminution of the inherent action of the lung, on account of the long compression which it had undergone. The resonance of the chest is still longer in being restored, and, indeed, in many cases, it never returns to the natural condition, in consequence of the contraction of the chest, which succeeds the absorption of the fluid. In examples of this kind, percussion yields a completely dull sound long after the re-appearance of the respiration under the stethoscope.*

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* M. Cayol pointed out to me a case in which a similar transmission of sound took place through a copious collection of air in the chest.—*Author.*

The successive increase and diminution of the quantity of the extravasation, are also indicated by another sign, which, although much less evident, less constant, and less certain than the preceding, is, nevertheless, frequently of use: I mean *mensuration of the chest*. If we uncover the chest of a person affected with pleurisy with abundant effusion, we shall, in most cases, easily perceive, that the affected side is larger than the sound one. This dilatation of the affected side has been noticed by all writers on empyema since the time of Hippocrates; but I have ascertained that the same thing takes place in the effusions of a recent pleurisy. I have often found it very distinct after two days' illness. It is, of course, much more evident in lean than fat persons; and it is very indistinct in women with large mammæ. On measuring the affected side with a piece of ribbon, we find it enlarged, but never so much as it appears to the eye. An increase of half an inch on the circumference is very obvious to the sight. In proportion as the effusion diminishes, the dilatation of the chest insensibly disappears; and sometimes, as we shall see more particularly hereafter, the affected side becomes narrower than before the disease.†

To these signs we must add another, also formerly noticed, *Ægophony*; a sign which is quite pathognomonic when it exists, and which always indicates a moderate degree of effusion. I shall not here repeat what I stated formerly, but will merely remind the reader—1. that ægophony appears about the period when the effusion begins to be somewhat considerable, when the sound on percussion becomes dull, and the respiratory murmur fails in the affected side; 2. that it disappears when the extravasation becomes very abundant; 3. that it may continue during several months, when the quantity of fluid remains stationary; 4. that after having disappeared, it re-appears upon the quantity of the extravasation being lessened; 5. that it goes off entirely when the fluid is altogether or nearly absorbed. I would also repeat, that the site of this phenomenon appears to be the upper or thinnest part of the layer of effused fluid; that where it is present, we frequently observe also bronchial respiration and bronchophony; and, finally, that when it is perceived over the whole or greater part of one side, it indicates a moderate quantity and equable diffusion of fluid over the whole surface of the lung. In this case, we also perceive, almost every where, some remains of the respiratory sound, the effusion being insufficient to compress the lung sufficiently to exclude the air from it; and should things remain in the same state during the whole duration of the disease, we may be assured that the lung is retained at a small distance from the ribs, by means of adhesions on different points of its surface.

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* Sometimes when the pleurisy has succeeded in a chronic catarrh, the sound on percussion returns before the respiratory sound, the air in this case being long impeded in its passage by the obstruction of the bronchia by mucus.—*Author.*

† The simple application of the hand upon the walls of the chest may, like mensuration, afford some useful results in pleurisy. It was stated in the First Part, (p. 10,) that the vibrations communicated to the thoracic parietes by speaking, are "no longer observable when, through disease, the lungs have ceased to be permeable, or are removed from the walls of the chest by an effused fluid." M. Reynaud has applied this observation to use, and he states that, by observing the places where this vibration is wanting, we may not merely recognize the side on which the effusion exists, but its extent and its variations of level. The ascertaining whether the absence of the vibration depends on pleuritic effusion or peripneumonic thickening, will be effected by ascertaining whether there exists ægophony or bronchophony and the crepitous rhonchus. It is proper to remind the reader, that it is in pleurisy that *the sound of friction, of ascent and descent*, was observed by M. Reynaud, and that this is the sign of a pleurisy without effusion. (See page 58, *note.*) I stated in a former note how my own observations tended to confirm this diagnostic sign; and, a much higher authority, M. Andral, assures us (*Clin. Méd.* 2nd Ed. t. ii. p. 613.) that he has himself verified the accuracy of all M. Reynaud's observations.—(*M. L.*)

Ægophony is never wanting in the beginning of pleurisy in cases wherein the pleura had been heretofore quite sound; and the only thing which occasionally prevents its being manifest, are previous adhesions over a great portion of the lung. It never fails to re-appear in acute cases, which are rapid in their progress, when the extravasation is sufficiently diminished; and it is more marked according as this has been of short duration. But in chronic cases, and even in acute cases wherein the absorption is slow, this *renewed ægophony* (*ægophonia redux*) is much less perceptible, and sometimes is entirely wanting; a circumstance easily explained by the theory formerly given of this phenomenon. None of the stethoscopic signs are more characteristic than this; and, accordingly, it has been readily recognised by all the physicians who have sought to verify my researches. Andral has taken notice of ægophony in most of his cases of pleurisy, although many of these were recorded at a period when he evidently had little acquaintance with, or experience of, auscultation[*]; he has also several times noted renewed ægophony upon the decrease of the effusion.[†] To the foregoing physical signs we have to add—the depression of the liver, in cases where the effusion is extremely copious. Stoll even observed a similar depression of the spleen, in one case, from a collection of fluid in the left side; but this viscus must be morbidly large before it can be felt by the hand, even in such a case.[‡]

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[*] Clin. Méd. t. ii. obs. 4, 5. 7, 8, 9. 12. 15, 16. 21. 26. 30. 32, 33.

[†] Ibid. obs. 5. 7. 15, 16.

[‡] To a complete master of auscultation and pathology, like our author, I am willing to concede the ability to distinguish pleurisy from pneumonia in every period of the

Double Pleurisy.—It occasionally happens that the pleura is inflamed on both sides of the chest at the same time. This, however, is a rare event, if we except those slight double pleurisies which occur a very few hours before death, in most acute and chronic diseases during the prevalence of an inflammatory constitution. In cases of this kind, it is by no means unusual to meet with slight pleuritic effusion on both sides, together with some thin false membranes, soft and evidently recent. Neither is it very rare to find, in the case of a severe pleurisy or pleuro-pneumonia, the sound side become affected during the last hours of life. It is, however, extremely rare to see the pleura of both sides simultaneously attacked with violent inflammation, accompanied by numerous false membranes and an abundant effusion: and when a case of this kind occurs, it is almost always speedily fatal. Indeed the same result very generally ensues when there is copious effusion on one side, and slight effusion on the other, or even when there is a middling effusion on both. If we occasionally see double pleurisies last some time, or even become chronic, we may be certain they are partial and of small extent, on one side at least; and even that the affection on one of the sides, most commonly supervenes only a very short time before death. Cases of this kind are recognized by the same signs as the single pleurisy; only that, in them, percussion and the inspection of the chest scarcely ever afford any indication. Ægophony, however, and the exploration of the respiration, enable us readily to recognize them, except when they are merely precursors of death; in which case their investigation is equally uninteresting as useless.

Local symptoms.—The local symptoms of pleurisy are, the stitch, dyspnœa, cough and recumbency on the affected side. These symptoms are more or less variable. The stitch is the most constant, but it is occasionally wanting in the most acute cases; it may exist in any part of the chest, but is most common below the nipple, or on the side, at the same height. Sometimes

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disease, and even to recognize their respective presence when co-existing in the same individual. I am, however, ready to confess that I have not always been able to make this distinction; and I find that I am not singular, in this respect, among the followers of Laennec. See Andral's Clin. Méd. t. ii. p. 574; and a paper just published by Dr. Stack in vol. iv. of the Dublin Hosp. Reports, p. 90. In making this admission, I feel it but just to add my conviction, that the instances are extremely rare in which a careful attention to the history of the case, and to the general and local symptoms, together with the practice of auscultation and percussion, will not enable any one to make the distinction in question. And here I would again impress upon the student the necessity, in all cases, of attending to the common symptoms as well as to the physical signs; and, still more, the necessity of acquiring a thorough knowledge of the *natural history and pathology* of every individual disease, before any attempt is made to recognize it in the living body by means of auscultation. With all its wonderful power and precision even the stethoscope opens no *royal road* to the knowledge of diseases: without attention to the common symptoms, mistakes will frequently occur; without an acquaintance with pathology, the grossest errors are inevitable.—*Transl.*

it shifts its place; and it is even by no means unusual to find it passing to the other side, without any transference of the inflammation: occasionally even, from the beginning of the disease, we have the stitch on the right side and the pleurisy on the left. This pain is increased by inspiration, (which action it therefore impedes,) and is extremely aggravated by cough. Pressure, even in the intercostal spaces, seldom excites it; and never except there exists a rheumatic affection of the muscles.*—The dyspnœa is very variable as to intensity. In some cases the patients are unconscious of its existence, although it is perceptible to the bystanders; and sometimes it is equally unobserved by both; in other cases it is extremely urgent, and speedily reaches the degree of impending suffocation. When the dyspnœa is not severe, it appears to be rather occasioned by the pain of the side, which moderates the inspiration, than by the compression of the lung by the effused fluid; since we find that it commonly ceases, after a few days, with the pain and other symptoms of acute inflammation, although at this time the effusion is more copious than before. No doubt the influence of habit and the development of puerile respiration in the sound side, contribute considerably to the diminution of dyspnœa in this case. The following circumstances have most effect in producing extreme dyspnœa: 1. a dry catarrh anterior to the pleurisy, which prevents the respiration from becoming puerile in the sound side; 2. a spasmodic asthma, producing the like effect; 3. an extremely copious extravasation occurring early, increasing rapidly, and giving rise, in the course of a few days, to anasarca of the affected side and even of the whole body. This last-mentioned case is rare in simple acute pleurisy; it is more common in the hæmorrhagic variety, and in those cases which assume a chronic tendency from their origin: it constitutes the acute empyema.—The cough is usually infrequent, dry and moderate; sometimes it is altogether wanting. If expectoration exists, it is scanty, pituitous, or consisting of a colourless mucus, at times intermixed with some streaks of blood; it is only mucous and plentiful, when the pleurisy is complicated with pulmonary catarrh.—The patient generally lies on the affected side, or on the back; and cannot turn on the sound side without experiencing a great increase of dyspnœa. The contrary, however, is by no means uncommon; as many patients can only lie on the side not affected. But all the other local symptoms, as well as this, may be wanting; and this is the case to which we give the name of the *latent acute pleurisy.*

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* My own experience leads me to consider a tenderness of the intercostal spaces on pressure as far from unusual in acute pleurisy; and as extremely common in chronic pleurisy. I am supported in this opinion by Andral (Cl. Méd. t. ii. p. 555), by Chomel (Dict. de Méd. t. xvii. p. 129) and also by Broussais (Phleg. Chron. t. i.)—*Transl.*

General symptoms.—A high fever attends pleurisy from its invasion. Most commonly, however, this only lasts a few days, particularly if the disease is treated by prompt bleedings. The fever ceases along with the stitch, and the patient, finding his appetite and strength return, fancies himself cured, although there still exists an abundant extravasation in the chest, which cannot be got rid of for a long period, even should nothing interfere to check the process of absorption. And the physician who does not explore the chest, must fall into the same mistake as his patient. I have known cases in which the thoracic resonance and respiratory sound have not completely returned before the expiration of six months, although the patients, judging from the continuance of the pain and fever, asserted that they had only been ill, in all, four or five days. It is very rare, even in the mildest cases of acute pleurisy, and in which the inflammation is most speedily checked, for the effusion, if at all considerable, to be completely absorbed, and the false membranes converted into cellular substance, in less than a month; most commonly this is not effected in less than two or three. When from any cause the absorption is checked, the pulse becomes again frequent, a slight fever arises, and the disease becomes chronic, or, at least, the absorption of the extravasated fluid is retarded for several weeks or even months. I have known cases of pleurisy, very acute at their onset, in which the chest was not freed from fluid before the end of two years. Generally, indeed, even the true and simple pleurisy does not preserve the character of an acute disease, beyond the first days, and rarely does it prove fatal within this period. The disease has an essential tendency to become prolonged; and, indeed, the state of resolution of the most acute pleurisy has all the characters of a chronic affection. After all, the extreme frequency of pulmonary adhesions proves, that the greater number of pleurisies are sooner or later cured. The double pleurisy is commonly latent, not only on account of the frequent absence or dullness of the pain, but because it occurs only as an intercurrent affection of some other dangerous disease.

The occasional causes of pleurisy are those of inflammatory diseases in general. The inclemency of winter, and the long continued impression of cold after violent exercise, are the most common. The metastasis of gout, rheumatism, or cutaneous eruptions, the suppression of an habitual discharge, and causes of a purely mechanical nature, such as a blow on the chest or fracture of the ribs, have sometimes produced the disease. It has even been asserted by some creditable observers, to be contagious, in certain epidemics;* and the same may be said of many inflammatory and other diseases.

Among predisposing causes, the most evident are, a slender frame, narrowness of the chest, the immoderate use of spirits, and, most of all, tubercles in the lungs. These last, even previously to their becoming soft, seem to be the cause of those successive attacks of pleurisy in the same person, which we sometimes meet with, and which have a great tendency to become chronic.—In conclusion, I would remark of pleurisy, as of pneumonia, that the occasional and predisposing causes are frequently hidden from us, or at least seem insufficient to account for the attack. Thus, for instance, although we frequently find in youth and middle life, that plethora, violent exercise, a debauch or cold, frequently occasion pleurisy; we know that it is still more frequent among old persons, in subjects of delicate constitution, and valetudinarians who take great care of their health. The most severe cases occur in the weakest subjects, in persons of a cachectic habit, or in such as are debilitated by excesses of any kind—by gout, syphilis, scurvy, cancer, and, most of all, by years.

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* *Valleriola*, lib. vi. obs. ii.; *Maret*, Nouv. Mém. de l'Acad. de Dijon, 1784.

SECT. V.—*Chronic Pleurisy.*

There are three kinds of chronic pleurisy; 1st. that which is chronic from its origin; 2nd. acute pleurisy become chronic; 3rd. pleurisy complicated with certain organic productions on the surface of the pleura, bearing a gross resemblance to cutaneous eruptions. I shall not notice this last variety in the present chapter.

Anatomical characters. Chronic pleurisy does not differ essentially, in its anatomical characters, from the acute. In the chronic disease, the pleura is commonly of a deeper red, and the serous effusion is more abundant and almost always less limpid, being mixed with a great quantity of very small albuminous flocculi. The abundance and minuteness of these are sometimes so considerable, as to render the liquid quite puriform, even when left undisturbed. More commonly, the serum is of a lemon colour, although still less limpid than in the acute disease, and thickly intermixed with the small fragments just mentioned, which, like coarse flour diffused through water, fall to the bottom when at rest. In such cases, these puriform fragments accumulate in great quantity in the most depending parts of the thoracic cavity, and by their consistence form a link between the sero-purulent effusion and the false membranes. These latter never have the consistence of boiled white of egg as in the acute pleurisy. We break them with the greatest facility in detaching them from the pleura; they are friable between the fingers, and sometimes their cohesion is so slight that we might mistake them for a deposition of the thicker parts of the pus. The extravasated fluids in chronic pleurisy are rarely so free from smell as in the acute; sometimes they have a heavy odour, more disagreeable than that of healthy pus, or a strong alliaceous odour, analogous to that of gangrene.* Confining the term chronic pleurisy to the affection just described, and, therefore, not even including those cases of acute pleurisy which are chronic in respect of their length of duration, we may say that the disease has rarely any natural tendency towards resolution. In cases of extravasations which have lasted several months, we frequently find no mark of any step towards the conversion of the false membranes into cellular substance. A cure, however, is sometimes effected in another manner, as will be shown presently.

The effusion produced by chronic pleurisy tends, most commonly, to become daily more considerable. The affected side becomes manifestly larger; the intercostal spaces grow broader, and rise to a level with the ribs, and sometimes even higher. The lung of the affected side, compressed towards the mediastinum and spine, and retained in this position by the pseudo-membranous exudation which covers it completely, is sometimes reduced to so small a size, as to be hardly from four to six lines thick, even in its middle; and without a careful examination, might be considered as totally destroyed. In this state, the pulmonary tissue is soft, supple, and dense like a piece of skin, without any crepitation, more pale than natural, greyish, and almost entirely without blood. Its blood-vessels are flattened, and frequently appear quite empty. The alveolar texture is nevertheless still very distinct. This case constitutes the most common species of empyema, the *purulent empyema* of surgeons, or, at least, of modern surgeons; for I apprehend no one now considers empyema as the product of a vomica which has burst into the cavity of the pleura. A softened tubercle may, indeed, discharge its contents in this manner, and may thus become the cause of a considerable effusion, by exciting a chronic pleurisy, but in such a case the tuberculous matter must only be considered in the light of an extraneous body determining inflammation, and consequent effusion, by its mechanical or chemical qualities. It is also to this species of pleurisy that we must refer those histories of *lungs entirely destroyed by suppuration* which we find recorded in the older writers.

There is still another variety of chronic pleuritic effusion: although it is of rare occurrence. In this, the serosity is greenish and the pus of a yellowish colour, and of a degree of consistence very like that of certain sputa. This variety is especially found in cases wherein the effusion is scanty and confined, on account of previous adhesions. This species of pus has a greater tendency to be converted into the accidental tissue, than that formerly described. Sometimes, even, I have seen its thickest parts already divided into irregular spaces, like those of cellular substance.—Occasionally the effusion of the chronic, as well as of the acute pleurisy, finds its way into the bronchi or through the walls of the chest.

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* The great and *peculiar* fetor of the *expectoration*, has been considered by some writers as almost characteristic of the communication between the bronchi and the sac of the pleura, in cases of chronic pleurisy. Some have compared this odour to garlic, some to that of phosphorated hydrogen, and others to other ill smells. See Andral's Clin. Méd. t. ii. p. 561. Professor Nespoli, in an ingenious pamphlet on the diagnosis of diseases of the chest, published at Florence in 1825, dwells a good deal on this sign. See his *Discorso recitato nel riaprire il corso*, &c. 1825. This author describes the expectoration in such cases as having "l'odore di *assafetida* ma assai più questa penetrante e acido." p. 25.—*Transl.*

Signs and symptoms.—The physical signs of chronic pleurisy differ in no respect from those of the acute, with this exception, that we rarely meet with ægophony in the former, because the effusion is almost always abundant before the patient determines to consult the physician. The disease usually begins in an insidious manner. Either the stitch does not exist at all, or it is obscure, momentary, and felt after long intervals. A slow fever creeps on by degrees; there is cough, and, more frequently than in the acute disease, the cough is attended by a mucous, sometimes even by a puriform expectoration. Emaciation proceeds with more or less rapidity; the digestive functions become disordered; frequently the sensibility of the stomach is at times so much increased, that the patient can hardly bear not merely the lightest food, but not even drink. Sometimes a puriform expectoration comes on all at once, and is so copious as to lead to the apprehension that the pus has made its way into the bronchi. This appearance may be repeated several times in the twenty-four hours; and it is observed, in many cases, where there exists no communication with the bronchi.

Chronic pleurisy constitutes, as stated above, the purulent empyema of surgeons. Although its presence indicates a more unfavourable state of the constitution than exists in the acute disease, it affords a more favourable chance for the success of the operation of empyema. The chief obstacle to the success of this operation, in the acute disease, consists in the difficulty which the lung finds to unfold itself to its former dimensions, bound down, as it is, and compressed against the spine and mediastinum, by the false membranes. Now, in the case of the chronic disease, this obstacle does not exist, since in it there are either no false membranes, or they are soft, friable, and seemingly formed of the thicker portion of the purulent fluid.

The true chronic pleurisy is essentially chronic. At no period of its course does it present the intense fever, severe pain, or energetic re-action, which characterize an acute disease. It only attacks persons who have become cachectic from some cause or other, and particularly in consequence of a tuberculous affection of the lungs. The complication just named, as well as the moderate degree of the local and general symptoms, conspire to make it most commonly latent. Hence it has almost always been confounded with phthisis pulmonalis.*

The acute pleurisy become chronic, differs from the preceding variety in some essential points. The disease assumes this course whenever any thing interferes with the speedy absorption of the effused fluid, and the conversion of the false membranes into the adventitious serous tissue; and the cause of this interruption is, in general, a state of debility or cachexy, originating in some complication anterior or posterior to the pleuritic attack. The extreme abundance of the effusion is one of the circumstances from which we may most certainly augur that the disease will become chronic, if indeed it does not prove fatal in the acute stage. The hæmorrhagic pleurisy, as already stated, almost constantly affects this course. The transition from the acute to the chronic state is announced by the gradual diminution of the fever. This is at times entirely absent, but almost constantly re-appears towards evening; and every now and then, from some slight error of regimen, or without any appreciable cause, it becomes intense. With these exceptions, the greater number of the animal functions exhibit no disorder; in many cases there is even no dyspnœa, when the patient is quiet. The digestion is often good; but the stomach is more delicate than in health: it can only receive a small portion of food at a time; and when the patient happens to have a good appetite (which is by no means uncommon) and indulges it, he is frequently affected with vomiting, diarrhœa, or, at least, by uneasy digestion.

The physical signs of this variety are nearly the same as the preceding. Ægophony is no longer perceptible after the effusion has become considerable; and it rarely re-appears upon the diminution of this, as in the acute disease when a spontaneous resolution takes place, owing to the destruction of the elasticity and tonicity of the bronchi, occasioned by the long compression of the lung. For the same reason, the respiratory sound is long in returning, at least in the lower parts of the lungs. In the upper parts, it frequently returns before the dilatation of the chest is at all diminished. A cure in this affection is not common, and certainly does not take place in more than one half the cases. Death in general does not ensue before the occurrence of great emaciation; and it is accelerated by the supervention of [illegible] or sanguineous or serous congestions in the brain, or of slight inflammations of the lungs, which organs had hitherto continued healthy. When the anasarca becomes general, it is greatest in the arm and leg, and also on the trunk, of the diseased side.

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* True chronic pleurisy is a very common disease; and there are few more deserving the particular attention of practitioners. It is, as our author observes, [illegible] always confounded with phthisis pulmonalis. Many examples of this mistake [illegible] be cited from our periodical literature, and still more could be furnished by [illegible] thological practitioner of experience. Sometimes, however, it is entirely [illegible] as a pectoral affection. For several interesting examples of this disease I [illegible] "Original Cases," &c.; and for some admirable remarks on the diagnosis [illegible] it and phthisis, I refer the reader to Broussais's *Phleg. Chron.* t. ii. p. 203. [illegible] most striking of the general diagnostic symptoms there mentioned, and which I [illegible] frequently observed, is the return of the pulse to the natural frequency after [illegible] ticularly after a night's rest, in the pleuritic affection.—*Transl.*

SECT. VI.—*Contraction of the Chest, consequent to certain Pleurisies.*

There are some cases of pleurisy wherein the affected side never becomes sonorous in the trial of percussion, although the disease has been completely cured and the effused fluids absorbed. Although cases of this sort are not very rare, they have not hitherto attracted sufficiently the attention of practitioners; and I apprehend that the pathological character of the affection, although noticed by several authors, has not as yet been correctly or completely described. The subjects of this morbid alteration are sufficiently distinguishable even by their external shape, and by their gait. They seem constantly to lean towards the affected side. This is always manifestly narrower than the opposite side, there being frequently more than an inch of difference, when they are both measured by means of a cord. The length of the chest is equally diminished: the ribs are closer to one another; the shoulder is lower; and the muscles, especially the pectoral, are only half the size of those of the opposite side. The difference of the two sides is so remarkable, that, at first sight, we would think it much greater than it is found to be by admeasurement. The spinal column generally remains straight; sometimes, however, it at length yields through the effect of the habitual leaning towards the diseased side. This habit gives to the individual the appearance of being somewhat lame. The greater number of individuals in whom I have detected this deformity, attributed it to some severe and long-continued disease of the chest, the exact character of which had never been ascertained: some had well-marked attacks of pleurisy or pneumonia of long standing. I have more than once pointed out this alteration of the form of the chest to individuals, in whom it existed in a great degree, who were not themselves at all aware of its existence. All of these had experienced a disease of long duration, the principal seat of which had seemed to be in the thorax: but in several the affection appeared to have been only slight.

I had long observed this contraction of the chest before I had an opportunity of proving, by dissection, the particular lesion to which it was owing. I attended a patient for several years, in whom it had existed in the greatest degree for fifteen years. He was subject to a chronic catarrh, and was so short-breathed that he might be considered as asthmatic. In this instance, however, it is probable that the dyspnœa was more owing to the catarrh than the deformity of the chest; as, in the greater number of cases in which I have observed this state, although the respiration was shorter than usual, still it could not be considered as amounting to habitual dyspnœa. A remarkable instance of this is furnished in his own person by M. ———, a very distinguished surgeon of Paris. In this gentleman, the left side of the chest has been contracted ever since an attack of pleurisy in his youth. It yields a completely dull sound on percussion on the lower and lateral parts; but the respiratory sound is distinct, only somewhat weaker than on the other side. M. ——— enjoys excellent health: he has a strong and sonorous voice, and has for several years past delivered lectures, sometimes two in one day, each of an hour, without inconvenience. Six or seven years since, he had a very severe attack of fever, in which the respiration did not suffer more than in persons in general.

Cases of very great contraction are rare: but those in which the alteration of the shape and the decrease of resonance on percussion are only slight, are very common. This contraction, when strongly marked, coincides always with the formation of the adventitious fibro-cartilaginous membranes formerly described. The cause, no doubt, of this lesion having been so long unknown, is its dependence on so obscure a disease as the hæmorrhagic pleurisy. The symptoms of this affection are, indeed, very variable, and its progress very irregular. In its commencement, it has frequently no resemblance to the simple acute pleurisy: and it is truly better entitled to the name of *latent*, than any other variety. In it, the pain is infrequent, temporary, and often so trifling as not to be mentioned by the patient, unless questioned respecting it. The dyspnœa is sometimes very slight; the cough infrequent and dry. Sometimes, however, particularly in asthmatic persons and in those subject to catarrh, there is much dyspnœa, and a more or less abundant expectoration: but in cases of this kind, the whole complexion of the disease is rather that of catarrh or asthma, than of pleurisy. In short, in many cases, one would be misled by the symptoms to look for the site of the disease any where else, rather than in the chest. A state of languor and extreme debility, a slight degree of fever, a loss of appetite disproportioned to the apparent mildness of the disease, are frequently the only symptoms. The cough is so inconsiderable, as to be frequently overlooked both by the patient and the physician.

In cases of this kind, the stethoscope and percussion afford the only means of ascertaining the nature of the disease. By itself, indeed, percussion will only enable us to suspect the precise nature of the affection, as the absence of sound may be owing to infarction of the lung as well as effusion into the chest; but when conjoined with auscultation, which will detect the respiratory sound at the root of the lungs only, the nature of the case will be at once evident. The contraction of the chest, which coincides with the absorption of the serous portion of the effusion, begins at an early period of the disease; but it is often not very perceptible until after several months; and, frequently even, the patient has long been in a state of doubtful convalescence before it is at all manifest. At length, however, after a long period of ill health, sometimes of no less duration than two or three years, the strength, appetite, &c. return, and the patient regains perfect, and in many cases, permanent health. The affected side, nevertheless, still yields a dull sound—frequently the complete fleshy sound—on percussion; and the respiratory sound is commonly weaker than natural over the whole of it, and in the lower parts it is either not perceived at all, or it is extremely indistinct. On examining the chests of those who had this contraction in a very decided manner, I have uniformly found the fibro-cartilaginous adhesions above described, and the lung so compressed and flaccid, as to have the appearance of muscular substance, of which the fibres are so fine as to be undistinguishable. Sometimes the compressed lung is as red as muscle; at other times, it is of a grey colour, somewhat deeper but less transparent than the muscles of fishes. This last I consider as the proper colour of lung simply compressed, and imagine the red colour to be owing to a passive congestion of blood in the part, like what occurs after death.

The absence of the respiratory sound in the case of contraction of the chest, is not, as might be imagined, owing to the thickness of the adventitious membranes. Even in the acute pleurisy, with the most copious effusion, it is not the mere distance of the lung from the side, that occasions the failure of the sound of respiration. This is proved by the fact, that the greatest degree of fatness, the size of the female breast, the anasarcous state of the integuments, or thick clothing, do not sensibly diminish the sound, when it is considerable; whilst, on the other hand, it is hardly at all perceptible even in the leanest subjects, when they, either naturally or from nervous apprehension under the first application of the stethoscope, breathe in an imperfect manner. It is, therefore, evident in these cases, that the diminution or absence of the respiratory sound, is much more owing to the imperfect dilatation of the air-cells, than the thickness of the compressing body. In the less severe cases of this nature, and when the contraction of the chest is not very considerable, after the complete conversion of the false membrane into the cartilaginous substance, the respiration returns in a slight degree in the affected side, but less strongly than in the opposite one. As an instance how long it may be before this variety of pleurisy is completely terminated, I may state, that, in the patient from whose chest I had some drawings made, it was not until two years and a half, to reckon from the invasion of the disease, or a year, to reckon from the period of his convalescence, that I began to perceive a slight sound of respiration below the clavicle and on the upper part of the back. In certain cases, the respiration becomes good over the superior parts of the chest, without being at all restored on the inferior; and this may be owing to the fibro-cartilaginous membrane not extending to the upper lobe: and in all cases, even where the respiration is perceptible in some degree over the whole chest, it is always stronger in this situation.

However weak and imperfect the respiration may be in a lung compressed in this manner, the contraction of the chest must, nevertheless, be considered as a mode of cure. In the cases where it exists in the greatest degree, it does not always render the individual an invalid, but may even be compatible with a considerable degree of general vigour. It, moreover, takes away every apprehension of a relapse; for if, as we have already said, pleurisy is very rare in the cases of cellular union of the lung and pleura, it must be considered as almost impossible when the union is effected by means of a tissue so little disposed to inflammation, as is the fibro-cartilaginous.

Although in all the cases I have met with of decided contraction of the chest, I have found the lung attached by means of the fibro-cartilaginous membranes above described, closely united to one another by a cellular tissue of subsequent formation; I am, nevertheless, of opinion, that the contraction may be found in an equal degree, subsequently to a pleurisy which has terminated very slowly with the formation of merely cellular adhesions. Indeed, in every case wherein I have found one lung adherent throughout, by means of a pretty copious cellular tissue, I have always thought this side of the chest narrower than the other. I may add that this condition of parts is so constant, that it is surprising the morbid alteration of shape we are now considering had not before attracted the notice of anatomists. The difference between the sides is particularly observable after both lungs are removed. I had noticed this circumstance when I was a student, and before I had ascertained that the smaller side was always that in which the adhesions existed, or in which they were most considerable. I mentioned the thing to one of my teachers, and was informed that this inequality of size was owing to an original malformation.—When both lungs are adherent, the chest is generally very narrow; and the resonance on percussion is imperfect even when the sound of respiration is pretty good. With all this, it must be admitted, that these cellular adhesions, even when very extensive, have no bad effect on the respiration and general health; almost every adult subject having these, as it is well known, in a greater or less degree.

In the case of large pulmonary abscesses, or extensive or numerous tuberculous excavations, the containing parts begin gr dually to collapse shortly after the discharge of the matter, and the walls of the chest follow the retrocession of the soft parts. This partial contraction, which is chiefly found on the upper and anterior parts, is very perceptible after the cicatrization is complete. Bayle made the observation that the chest seemed to be contracted in the case of phthisis of long standing, but he does not seem to have been acquainted with the cause of it. In the case of phthisis this cause is usually twofold; depending no less on the contraction of the tuberculous excavations, than on the latent or manifest pleurisies, with which these are commonly complicated.

From what has gone before, it results, that it is not to the adhesions themselves that we are to attribute the contraction of the chest, but to the more or less chronic manner of their development; and, further, we may conclude that the more rapid has been the absorption of the effusion, the less fear is there of any contraction ensuing. In fact, the longer the lung has been retained in a state of compression, the greater is its loss of natural elasticity; and in this respect it is merely in accordance with other organs; a muscle long compressed by a bandage is in a like predicament. The bony compages of the chest necessarily contract as the effusion is diminished, and exactly in the same degree, unless the lungs are proportionally expanded: there cannot remain a vacuum in any part of the animal body. In pleurisies accompanied with a copious extravasation, and whose resolution is consequently slow, the contraction of the affected side is almost always very discoverable by the eye and by mensuration, very long before the complete absorption of the fluid.

As the affection now treated of is very little known, I shall subjoin four cases of it. The first and second of these exhibit the disease at its termination; the third points out the progressive stages as well as the state of the affected parts, very near its close; the fourth is an example of the hæmorrhagic pleurisy, which would have terminated in the same manner if a cure had been effected.

Case XXXI.—*Contraction of the chest in a consumptive patient.* A woman, aged about thirty-seven, came into the Necker Hospital in May, 1818. She had been affected with cough for several years, but more severely within the last four months. She was in a state of great emaciation, and was decidedly hectic. The voice resounded strongly beneath the clavicle and in the axilla of the right side, but did not traverse the stethoscope—*(bronchophony from congregated tubercles.)* Over the same points, there was a strong guggling rhonchus, indicative of the transmission of air through the softened tubercles *(cavernous rhonchus.)* The sputa were yellow, opaque, puriform, and somewhat diffluent. It being apparent from these results that this was a case of hopeless consumption, the patient was not more particularly examined afterwards; except that, on the 19th, pectoriloquy was found very distinct in the right axilla. She died on the 24th.

Dissection.—Upon inspecting the body after death, the left side of the chest was found to be evidently diminished in all its dimensions; the intercostal spaces were so much contracted that the ribs seemed to touch each other. The right side was of natural form and size, and appeared larger than the other by one-half. This deformity had not been observed during life, owing to the patient's clothing. The right lung adhered to the diaphragm and the mediastinum, in its whole extent, by well organized cellular adhesions. In the superior lobe there was one tuberculous excavation capable of containing a small pullet's egg. In it there were about two spoonfuls of tuberculous matter of the consistence of pus. In the same upper lobe, there were several other lesser cavities, still filled with tuberculous matter, softened to the same degree; and also many crude tubercles. The left lung was one-half less than the right; it was depressed towards the spine and ribs, so that its internal surface was turned forwards, yet did not reach further than the origin of the cartilages, and did not at all cover the heart: it adhered so firmly to the ribs that it could not be separated without detaching it from its investing pleura. This adhesion was effected by the medium of a substance altogether similar, in texture, colour, and consistence, to the fibro-cartilaginous bodies. This substance was about two lines in thickness, and was divided into two layers, which were separated from each other by a third, much thinner. This was of a bluish grey colour and semi-transparent,—qualities which formed a contrast with the whiteness and opacity of the others. The intermediate layer resembled perfectly the transparent central portion of the intervertebral fibro-cartilages; it was less solid than the other two, yet possessed, with them, the fibrous structure. The pleura pulmonalis and costalis, especially the former, were very distinct, exteriorly to these false membranes. The pulmonary tissue, more flaccid and redder than natural, had lost its crepitous feel, and was of the aspect and consistence of muscle. In the upper lobe there was a tuberculous excavation capable of holding a large walnut, and, like that on the other side, was lined by a soft and whitish membrane.

CASE XXXII.—*Contraction of the chest subsequent to chronic pleurisy, with the supervention of fatal acute pleurisy.* In March 1818, a man, aged eighteen, came into the Necker Hospital, affected with recent diarrhœa and a complaint of the chest of some standing. In the winter of 1816 he had been affected with a violent cold, attended by severe cough, much dyspnœa, and great pain of the left side. This side of the chest was now evidently smaller than the right in every dimension; and the shoulder being thereby lower, the man had the appearance of being lame. He bent the left leg more than the right, and when he stood upright he seemed to support himself on his left hip. This side yielded a dull sound on percussion, and the sound of respiration was scarcely audible, except very feebly below the second rib and along the spine. The right side, on the contrary, sounded well on percussion, and afforded perfect respiration under the stethoscope. The diagnostic was here given—*Diarrhœa, in a person cured of pleurisy by adhesion of the lungs to the pleura by means of a fibro-cartilaginous membrane.* For the first month after this man's admission, he remained much in the same state. In the succeeding month, his health improved. The diarrhœa ceased; the slight cough which he had had, disappeared, and the appetite and, in some degree, the strength, returned. The respiratory sound became much more perceptible at the roots of the left lung and on the upper and fore part of the chest on the same side, where, indeed, it was very distinct from the clavicle to the fourth rib, only weaker than on the opposite side. In May the diarrhœa returned, and he was also attacked with a slight pain of the right side of the chest, which yielded to the application of leeches. He from this time gradually got worse; and well-marked symptoms of chronic peritonitis were added to those already existing, with great aggravation of suffering and loss of strength. On the 12th July, he was further seized with a very violent and sharp pain in the right side, aggravated by cough and deep inspirations. The chest was again examined at this time. On the left side, anteriorly, the respiratory sound was distinct and of moderate strength from the clavicle to the fourth rib; and, posteriorly, from the top of the shoulder to the sixth rib: it was also beginning to be perceptible on the lower parts of this side.* Now, however, it was no longer perceptible over the whole of the right side, except between the clavicle and the second rib, along the sterno-costal cartilages; and even in these points it was much less than in the upper part of the left side. On the right back it was more perceptible, but intermixed with a slight rhonchus; and exactly at the roots of the lung on this side, it was louder than in any other part of the chest. After this exploration the following addition was made to the diagnostic—*Recent pleuro-pneumonia of the right side; the effusion not yet very considerable, but in greatest quantity in the lateral parts of the cavity of the pleura.* On the 14th, the pain of the side was nearly gone; but the cough was severe, and the expectoration yellow, frothy, but not adhesive; the respiration was now heard equally over the whole right side, but only in a slight degree;* it was also perceptible over the whole of the left side, except below the sixth rib. The patient became somewhat relieved after this period, but he finally sunk on the 12th August.

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* This return of respiration in parts where it had previously been imperceptible, is analogous to the establishment of puerile respiration in a sound lung upon the other becoming diseased; and seems to me confirmatory of what I had occasion to state above (page 415, et seq.) respecting the active dilatation of the lungs.—*Author.*

Dissection.—The left side of the chest was found one-third smaller than the right, and the intercostal spaces much narrower. The lung on this side was intimately united to the pleura of the ribs, in its whole extent, by a false membrane one line thick in its superior part, and two lines in its inferior part. It was white, of a consistence almost equal to that of fibro-cartilage, and of a texture somewhat similar; as fibres, both longitudinal and transverse, were very visible in it, especially at its inferior part. In several places this false membrane was united to the pleura by means of cellular substance containing serum; in other places these two were closely united, yet still very distinguishable from each other. The lung was flattened upon the mediastinum. Its substance was still somewhat crepitous, but flaccid and injected with serum. It contained many tubercles, for the most part miliary. The right lung adhered to the costal pleura by means of a soft false membrane, which exhibited reddish vascular points on its surface. A still thicker layer of the same kind invested the diaphragm and adjoining lung. There was about a glassful of reddish serosity in the cavity of the pleura. The tissue of the lung was crepitous, containing a considerable quantity of serosity, and also several miliary tubercles. The whole of the intestines were united together in one mass, and to the peritoneum, by well-organised cellular substance, intermixed with small tuberculous masses. The mucous membrane of the cæcum and colon were ulcerated.

CASE XXXIII. *Hæmorrhagic pleurisy. Incipient contraction of the chest.*—A man aged sixty-six, in October 1817, caught a severe cold, and became affected with a dry cough, and loss of appetite. In the following January, hæmorrhage from the lungs, and pains of the chest, were added to his complaints. He got worse, with a good deal of irregular fever, and great dyspnœa on motion, and came into the Necker Hospital on the 12th of March. At this time the face was flushed, the tongue white, and the pulse hard and frequent; there was much cough, with an expectoration of yellowish, semi-transparent, and somewhat frothy sputa, so viscid as to adhere to the bottom of the vessel when reversed. On the left side, percussion elicited every where the natural sound, and the stethoscope indicated the respiration to be good On the right side, percussion did not give a very good sound anteriorly, and gave an imperfect sound posteriorly; and the respiration was inaudible over the lower half of the back and side. The following was the diagnostic recorded: *Chronic pleurisy on the right side, with a slight acute pneumonia; tubercles.*[*] The patient was bled and leeched with relief. On the 3rd April, he felt pretty well; there was little fever; and the chest sounded nearly equally well under both clavicles: the respiration, however, was still weaker under the right, and was not at all perceptible over the remainder of this side. During the following fortnight, the patient continued to improve: he always lay on the sound side. On the 22nd, the chest sounded worse on the right back, but much better on the upper parts before. The respiration, however, was in these very indistinct, and was not at all audible below the second rib; in the axilla, it was accompanied by a slight rhonchus posteriorly; it was perceptible in a slight degree, over a space three fingers in width, along the spine, but nowhere else on this side. During the month of May, the patient became anasarcous, pale, and emaciated. However, the sound improved over the upper part of the right side before, and the sphere of the respiration was extended; it being now perceptible, in a slight degree, over the cartilages of the false ribs. On the 6th June, it was observed that the intercostal spaces on the right side were becoming smaller, and that the chest seemed to be contracting on this side: and on the 18th the contraction was quite obvious. The patient died on the 28th.

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* These signs, compared with those of the day before, indicated that the effusion was small in quantity, and diffused uniformly over the surface of the lungs. At this time I was very imperfectly acquainted with *Ægophony.—Author.*

Dissection twenty-eight hours after death.—On examining the chest it was found that the diameter of the right side, both laterally and from before backwards, was less by an inch than that of the left; and the intercostal spaces were narrower. The left lung was of the natural size, had no adherence to the pleura, and was crepitous throughout. It was gorged with blood, especially on the posterior part. It contained some tubercles in the early stages. The left lung was one third less than the right, and adhered intimately to the costal pleura by its whole upper lobe as low down as the second and third ribs. This adhesion was effected by a well-organized cellular tissue, evidently of ancient date. The remaining pleura of the lungs and ribs, in the whole of the lower part of the lung and the anterior portion corresponding with the false ribs, was also closely united; but this adhesion, which was evidently of recent date, was effected by means of a concrete albuminous layer, three lines in thickness, of a yellow colour and opaque, and partially tinged with blood. This membraniform layer could be removed in plates, which were of greater firmness the nearer they approached the pleura, on either side,—especially the pleura pulmonalis,—on which they had a degree of consistence nearly equal to that of the fibro-cartilages. On the contrary, the centrical layers were hardly of a tenacity double that of boiled white of egg. At the point of junction of the ribs with their cartilages, and on the anterior and external parts of the lung, this albuminous stratum was divided into two layers, one of which invested all that portion of the lung remaining unattached to the side, and the other the corresponding portion of the pleura; and these two afterwards united so as to form a shut sac or pouch. The inner surface of this sac was nearly every where of a bright red colour, which seemed as if applied with a pencil, and amid which no traces of vessels could be distinguished. This red colour did not at all enter into the substance of the albuminous stratum, which was, throughout, of a yellowish-white colour, and slightly semi-transparent, becoming more white and opaque as it approached the pleura. This sac contained about two glassfuls of a bloody but limpid serum, which compressed, at this part, the lung towards the mediastinum, leaving a space between it and the ribs of an inch and a half at its greatest width. Eight or ten pseudo-membranous bands crossed this cavity, being attached, at each end, to the pleuritic layers. These were softer and more fragile than old cellular adhesions; they were very thin, diaphanous, and colourless, towards their middle, but at their extremities they assumed greater firmness, and also the opacity and colour of the layers to which they were attached. In the top of this lung there was an external depression, corresponding with a fibro-cartilaginous substance internally, such as was formerly described under phthisis pulmonalis, and which was proved to be a true cicatrization of a tuberculous cavity. In its interior parts the lung was flaccid, not crepitous, dry, and resembling muscular flesh, over the lower three-fourths; while, in the superior fourth, it was crepitous, rose-coloured, and contained a little frothy serum. In the upper portion there were many immature tubercles. The pleura, in the parts corresponding to the false membranes, was much redder than natural. The heart was sound.—The cavity of the peritoneum contained about four pints of a reddish serosity, partially limpid. The whole of the peritoneum, as well on the abdominal parietes, as on the mesentery and intestines, was studded with innumerable small, grey, semi-transparent tubercles. Upon the mesentery and bowels these were quite transparent, and of the size of millet-seed; on the abdominal parietes they were flatter, greyer, and less diaphanous. The peritoneum was, moreover, marked in different places, by red punctuated spots, which were either of a bright red, or almost black. In these points, on scraping with [illegible]lpel, a small quantity of a semi-transparent exudation, o[illegible]lour, and mixed with dots of blood, could be detached. [illegible]r was very like paste, only a little fir[illegible]

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[*] The pneumonia was indicated by the exploration. I do not know what led me to suspect the existence of tubercles: probably the progress of the disease at its commencement.—*Author.*

It was so thin as only to be discovered by scraping: after its removal the peritoneum appeared somewhat less red. The tubercles seemed to be so intimately connected with the peritoneum, as not to be detached by scraping: this membrane was not sensibly thickened.

CASE XXXIV. *Hæmorrhagic pleurisy of the left side, with ascites and organic disease of the liver.*—A man had had an attack in the chest when twenty-four years old; but afterwards enjoyed very good health, until the summer of 1818, when he became affected with slight anasarca; and this was followed, in December, by cough. He came into the hospital on the 13th of the following March, in his forty-seventh year. At this time he presented the following symptoms: moderate œdema of the feet and legs, slight expectoration, partly white and frothy, partly yellow and opaque. The chest sounded equally well throughout, and the respiration (on a hasty examination) seemed scarcely perceptible on both sides. 17th. The chest, on a more careful examination, gave the following results: the left side behind seems to sound worse than the right,—both sides laterally yield a very dull sound,—the anterior-superior parts sound better. The respiration is very distinct over the whole of the right side; on the left, on the contrary, it is but very little perceptible below the clavicle and at the roots of the lungs, and not at all audible over the remaining parts of this side. The following diagnosis was given: *Imperfectly cured pleurisy of the left side, co-existing perhaps with tubercles.* In the end of March the œdema, which had been lessened, now became greater, the belly swelled, and the appetite diminished. At this time, the respiration on the right side was accompanied with a strong and sonorous rhonchus, on the lateral parts anteriorly, and was scarcely perceptible behind, and over the whole of the left side. Percussion elicited a very imperfect sound from the whole of the left side, except on the anterior-superior part; but the whole right side sounded well. Ægophony existed very distinctly over the supra-spinous fossa of the left scapula. The voice, having the *bleating* character strongly marked, seemed to come through the tube of the stethoscope, and was more acute than the natural voice of the patient. In consequence, I modified the diagnosis as follows: *chronic pleurisy of the left side, with pulmonary catarrh.* From the 30th March to the 15th April, the repeated examination of the chest showed that, on the right side, the sonorous rhonchus had in a great measure ceased, and that the respiration was louder than natural *(puerile)*; whilst, on the left side, the respiration seemed extinct, except along the inner border of the scapula and immediately below the clavicle, in which places it was just barely perceptible. The point just mention [redacted] ler the clavicle) was the only one on this side which yie ound on percussion. During the first days of April, vas still audible along the inner margin of the scapula, but the voice had assumed a grave key, and was heard better with the stopper of the tube removed; it disappeared entirely on the 5th. The natural respiration was short and somewhat noisy. The patient lay usually on the left side, sometimes on the back, but he could not lie on the right side. About the middle of the month, the respiration seemed more easy, and the patient could lie two or three hours on the right side; but the anasarca increased, and hectic fever came on. From the 7th to the 14th of May, the resonance of the chest became clearer on the anterior and upper part of the left side, and the respiration became more audible in the same points; it was also somewhat perceptible below the axilla, and was here accompanied by a pretty strong mucous rhonchus: in every other part of this side both the resonance and the respiration were wanting. He died on the 17th.

Dissection thirty hours after death.—The thorax appeared larger on the upper part, and smaller on the lower part, of the left side, than the right. The left cavity of the pleura contained at least two pints of a very bloody serum, and the lung, on this side, was thereby compressed towards the mediastinum and upper part of the chest. A large vacant space was thus left between the lung and ribs, which space gradually lessened from below upwards, but was still an inch in diameter as high as the middle of the scapula. This space was lined by a false membrane, the internal surface of which was tinged uniformly of a bright scarlet colour, and was crossed in every direction by fine fibrous bands of the same kind. In many parts of these false membranes there were clots and thin layers of a dark-coloured blood. The under layer of membrane which adhered to the pleura was of a greyish yellow colour, homogeneous, and of a structure and consistence resembling the fibro-cartilages. It contained within it an immense multitude of greyish tubercles, of a size from that of a millet-seed to a grain of corn, or even a pea. These were of a firmer consistence than the including membrane; and they formed more than one half of its whole substance. The left lung, compressed as already mentioned, was reduced to nearly one-fourth of its natural size; it was adhering to the pleura by its inner side, its summit, and by two-thirds of its exterior and superior aspect. Detached from the false membrane it was sound, only compressed, flaccid, and void of air except in its lower lobe. The blood-vessels and smaller bronchial tubes were flattened and much contracted. The right lung adhered to the ribs only in a few points, and by old and perfectly organised attachments. It was gorged with a great quantity of frothy serum which flowed out on its being cut. The cavity of the peritoneum contained five or six pints of serum. The liver was reduced to one-third of its usual size, and when cut into was found to be entirely composed of a multitude of small grains of a round or oval shape, and varying in size from that of a millet-seed to a hemp-seed.*

SECT. VII.—*Of circumscribed or partial Pleurisy.*

It occasionally happens, particularly in chronic pleurisy, that the effused fluid is confined to a partial space of small extent, owing to the obliteration of the remainder of the cavity of the pleura by former adhesion. I formerly stated, that inflammation is excited with much more difficulty, and occurs more rarely, in a pleura, the different parts of which are united by old cellular adhesions, than in a perfectly sound membrane. It is no doubt from the same cause, that, in the event of a fresh inflammation attacking a portion of the pleura that had remained unaffected in a previous seizure, the phlogosis and its products, coagulable lymph and serous effusion, are found to be exactly circumscribed by the old adhesions. These circumscribed pleurisies may occur in any part of the surface of the lungs, but are observed in the three following situations chiefly: 1st. the fissures between the different lobes; 2nd. the space between the base of the lungs and the diaphragm; and 3rd. the posterior-inferior and lateral part

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* Since the publication of the first edition of this work, which contained the earliest history of this singular termination of pleurisy, *contraction of the chest* has been noticed by many authors as well in this country as on the continent. I stated in a former note my opinion that this deformity is not the consequence of the *hæmorrhagic pleurisy* exclusively; and I may here add, that the fact of its occurrence after traumatic pleurisy, and after the operation of empyema, is sufficient proof of the correctness of that opinion. Baron Larrey in the Journ. Compliment. des Sc. Méd. for May, 1820, details several interesting cases of chronic pleurisy and empyema resulting from wounds, in some of which the contraction was strongly marked. In Dr. Hasting's valuable paper on Empyema in the first Number of the Ed. Journ. of Med. Science, p. 17, several cases of the same kind, following the operation of empyema, are mentioned; and a like contraction took place after a successful operation in empyema, in the very interesting case recorded by Mr. Jowett (Med. Chir. Rev. for July, 1826, p. 267). It may indeed be said, and perhaps truly, that the morbid alteration of structure within the chest is not the same in the two classes of cases. In my work entitled "Original Cases," two instances of contracted chest are given (Cases XXIV. XXV. p. 237. 245). The event of the first case is given in that publication; that of the second I shall here state. After the date of the last report in May, 1824, I saw the poor man occasionally during the remainder of that year and part of the succeeding, when he continued much in the same state. I then lost sight of him, and only learned lately that he died in the end of 1826, after having long laboured under symptoms which leave no room to doubt that perforation of the lung and consequent communication between the bronchi and pleuritic effusion had taken place. In another case, of which a brief notice is given in my little work (the Case of Mr. U. p. 225, Case XXII.) contraction of the chest has taken place in a very marked degree, and has happily been the medium of a complete cure. Mr. U. is now (Aug. 1834) in perfect health, but with the alteration of shape so beautifully detailed in the preceding section. In Mr. Jowett's case, the contraction of the chest appears to have been partially removed in the progress of the cure. This fact is sufficient proof that the contraction, in this instance, was not effected by means of the fibro-cartilaginous membranes. It is necessary to distinguish this species of contraction from that congenital variety recently described by M. Dupuytren, under the name of *Lateral depression of the thoracic parietes.* See *Repertoire Gén. d'Anat.* 1828.—*Transl.*

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consider how often we find the edges of these interlobular
adherent in cases of pneumonia attended by a slight p
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of the pneumonia leaves these fissures converted into a
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Diaphragmitis, is by no means uncommon: it often presents such a group
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(*Cyc. of Pract. Med.* vol. iii. p. 392) accurately represents the symptoms
cases of this affection. "Its characteristic features are, in addition to the
constitutional symptoms of acute pleurisy, pain more or less acute of the
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complete immobility of the diaphragm in inspiration, which is perform
elevation of the ribs; orthopnœa with an inclination of the body forwards
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lateral and posterior-inferior parts of the chest, are more common than the others. Sometimes I have met with partial effusions of this sort, near the summit of a lung, adherent in every other point, consisting only of one or two spoonsful; and I have observed similar collections between the inner edge of the lung and mediastinum. Andral has recorded a more extensive example of this variety.*

Certain cases of circumscribed pleurisy are formed in another manner and independently of any preceding adhesions: in some instances of very slight pleurisy, particularly such as accompany pneumonia, it frequently happens that the pseudo-membraneous exudation is confined to the sharp edges of the lungs, or, at least, is vastly thicker on these parts than elsewhere, thereby forming a sort of border, of a yellowish-white colour, and more or less opaque. Should it happen that these prominent borders adhere to the corresponding parts of the costal pleura, and any renewal of the inflammation takes place, it will be found that the fresh inflammation and its accompanying effusion, are confined within these boundaries. Some acute circumscribed pleurisies of this sort I have seen both on the diaphragm and in the interlobular fissures. Andral relates three cases of diaphragmatic pleurisy which probably were of the kind just mentioned;† although the scantiness of the details renders this somewhat doubtful. A fourth case of his, produced by the rupture of a gangrenous cavity on the base of the lung, was certainly of this kind.

Wherever these partial pleuritic collections are situated, if at all abundant, they strongly depress the pulmonary substance (being unable to extend themselves in any other direction) and form a sort of cavity within it, which, at first sight, one would be disposed to consider as formed by an actual loss of continuity of the lung: however, upon removing the pus and the false membrane, we find the pulmonary substance merely compressed and quite sound.—Partial pleurisies of the first kind, are less severe in themselves, because they are almost always complications of much more dangerous diseases, and particularly phthisis pulmonalis. Those of the second kind, on the other hand, are not of much consequence in any point of view; and this is sufficiently proved by the fact, that it is extremely rare to meet with such actually existing in the dead body, while it is very common to find the traces of their cure.

Signs and symptoms.—These circumscribed and partial effu-

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original disease; a mistake which might naturally occur if, as happens in many cases, the features of the preceding pleurisy had not been strongly marked. The *risus sardonicus*, to which the antients attributed so much importance as characteristic of this modification of disease, has not been found constant by modern observers.'—*Transl.*

* Cl. Mé obs. xxiv.

† Cl. Méd. obs. xix. xxxii.

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* Cl. Méd. t. ii. obs. xxiv.

† Cl. Méd. obs. xix. xxxii.

gue during the last hours of most diseases, particularly and severe continued fevers, and for the most part in and 3. the dry pleurisies, or such as are almost unaccom- d by effusion; all of which belong to the second class of or to pleuro-pneumonia, with the predominance of pneu- These cases, moreover, are only recognized with dif- y, because of our unwillingness to disturb uselessly, the last nts of our patients; more particularly in exploring the rior-inferior parts of the chest, where the effusion first shows f.*

SECT. IX.—*Treatment of Pleurisy.*

n acute pleurisy, when the patient is strong and plethoric, section has been uniformly recommended by the best prac- ners of all ages.† Should the pain and fever not yield to the or second bleeding, however, it will be better practice in this, in all other inflammations of serous membranes, to follow up cure by local bleedings. These, generally speaking, must be tinued until the pain and fever go off; and must be repeated uld they afterwards return. Cupping, in these cases is, in y opinion, preferable to leeches, and for many reasons: by the mer method we can take away the exact quantity of blood hich we want, while the operation is at the same time much uicker and less painful. Leeches are often very tedious and inful in their action; sometimes they scarcely fill themselves with blood, and at other times their punctures will continue leeding for twenty-four hours, and can only be closed by the

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[*] Pleurisy in some one or other of its forms, has in all ages attracted the marked attention of practitioners: on this account its literature is extremely extensive. For a list of the best works of the older writers on the subject, I refer the reader to Dr. Young's Medical Literature, 2nd Ed. p. 231. In these the student will obtain much information respecting the general symptoms and treatment of pleurisy; and, after studying the real pathology of the disease in our author, will derive much practical information from the perusal of them. The only works, however, which, in a pathological point of view, can at all bear comparison with the admirable account given by M. Laennec in the present chapter, are those of Broussais and Andral. See *Phlegmasies Chroniques*, t. i. p. 220: *Clinique Médicale*, t. ii. p. 85. Compared with these works it is but simple justice to state, that all our English writings relative to the pathology of pleurisy sink [illegible] significance. The earlier authors best deserving the student's attention on [illegible] of pleurisy are Stoll, Morgagni, Baglivi, Wendt, [illegible], Hoffmann, Bo[illegible]horn, Frank, &c. For some valuable remarks on [illegible]ic form of the [illegible] fer to Dr. Armstrong's Treatise on Scarlet Fever, [illegible] to Dr. A[illegible] the Pathology of Consumptive Diseases, Edin. [illegible] Hastings's paper on Empyema already noticed. [illegible] cellent articles on pleurisy [illegible] *Dict. de Scienc.* [illegible] richeteau; the *Dict. de M*[illegible] vii. p. 127, by [illegible] of *Medicine*, by Dr. L[illegible] the essays [illegible] recommended to the [illegible] admirable epi- [illegible] pathology of this d[illegible] *Transl.*

[†] [illegible] tamenia, the bloo[illegible] by preference, [illegible]

of the cavity of the pleura. In these cases the effused fluid, which is commonly purulent, is enclosed in a false membrane which unites very exactly the surrounding parts. When seated in the fissures between the lobes, the edges of these are found closely adherent by means of a very short cellular substance, of a formation evidently of more ancient date than the present disease, while the opposing surfaces of the lobes themselves are separated by the interposed effusion. Bayle was the first who described this species of partial pleurisy, which an inattentive observer might easily mistake for an abscess of the lung. This species is rare; a thing which seems rather singular, when we consider how often we find the edges of these interlobular fissures adherent in cases of peripneumonia attended by a slight pleurisy; even when the remaining surfaces of these fissures are quite free from adhesion. In such cases it would seem that the resolution of the peripneumonia leaves these fissures converted into a sort of sac, which will occasion the circumscribed effusion we have been describing, in the event of that part of the pleura being afterwards attacked by inflammation. In order to effect this circumscription of the fluid, it is by no means necessary that the adhesions on the edges of the fissures shall be so numerous or close as actually to close the passage of a liquid into the common sac of the pleura: if they are only pretty numerous, although with some intervals between them, they suffice to limit the progress of the inflammation. And the same thing occurs, as formerly mentioned, in other instances of circumscribed pleurisy; the albuminous effusion of the recent inflammation, never penetrating more than a few lines into the meshes of the old adhesions, however loose and unconnected these may be with regard to each other. The effusion between the base of the lung and the diaphragm, is usually circumscribed by the borders of the lung agglutinated by some previous inflammation. Occasionally, however, the extravasation is confined to a portion of the base, the remainder being adherent.* The circumscribed effusions on the

lateral and posterior-inferior parts of the chest, are more common than the others. Sometimes I have met with partial effusions of this sort, near the summit of a lung, adherent in every other point, consisting only of one or two spoonsful; and I have observed similar collections between the inner edge of the lung and mediastinum. Andral has recorded a more extensive example of this variety.*

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* This variety of partial pleurisy, and which constitutes what is sometimes termed *Diaphragmitis*, is by no means uncommon: it often presents such a group of symptoms as entitle it to particular notice. The following description of it by Dr. Law (*Cyc. of Pract. Med.* vol. iii. p. 392) accurately represents the symptoms in many cases of this affection. "Its characteristic features are, in addition to the ordinary constitutional symptoms of acute pleurisy, pain more or less acute of the cartilaginous border of the false ribs, extending into the hypochondria, and even the flanks; complete immobility of the diaphragm in inspiration, which is performed by the elevation of the ribs; orthopnœa with an inclination of the body forwards; an inexpressible anxiety of countenance, marked by a sudden change of features; the respiration more hurried and jerky than in ordinary pleurisy; the voice low and interrupted; a frequent desire to cough, but an obvious dread of it from the pain which it causes. The intellect is at first free, but when the case is aggravated, and the constitutional symptoms run high, delirium comes on.......... These may be regarded as the most constant and unequivocal signs of diaphragmatic pleurisy; others are occasionally present, viz. hiccup, nausea, vomiting, jaundice, &c. It was the presence of jaundice that led Valsalva to regard the accidental complication as the

Certain cases of circumscribed pleurisy are formed in another manner and independently of any preceding adhesions: in some instances of very slight pleurisy, particularly such as accompany pneumonia, it frequently happens that the pseudo-membraneous exudation is confined to the sharp edges of the lungs, or, at least, is vastly thicker on these parts than elsewhere, thereby forming a sort of border, of a yellowish-white colour, and more or less opaque. Should it happen that these prominent borders adhere to the corresponding parts of the costal pleura, and any renewal of the inflammation takes place, it will be found that the fresh inflammation and its accompanying effusion, are confined within these boundaries. Some acute circumscribed pleurisies of this sort I have seen both on the diaphragm and in the interlobular fissures. Andral relates three cases of diaphragmatic pleurisy which probably were of the kind just mentioned;† although the scantiness of the details renders this somewhat doubtful. A fourth case of his, produced by the rupture of a gangrenous cavity on the base of the lung, was certainly of this kind.

Wherever these partial pleuritic collections are situated, if at all abundant, they strongly depress the pulmonary substance (being unable to extend themselves in any other direction) and form a sort of cavity within it, which, at first sight, one would be disposed to consider as formed by an actual loss of continuity of the lung: however, upon removing the pus and the false membrane, we find the pulmonary substance merely compressed and quite sound.—Partial pleurisies of the first kind, are less severe in themselves, because they are almost always complications of much more dangerous diseases, and particularly phthisis pulmonalis. Those of the second kind, on the other hand, are not of much consequence in any point of view; and this is sufficiently proved by the fact, that it is extremely rare to meet with such actually existing in the dead body, while it is very common to find the traces of their cure.

Signs and symptoms.—These circumscribed and partial effu-

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original disease; a mistake which might naturally occur if, as happens in many cases, the features of the preceding pleurisy had not been strongly marked. The *risus sardonicus*, to which the antients attributed so much importance as characteristic of this modification of disease, has not been found constant by modern observers.'—*Transl.*

* Cl. Méd. t. ii. obs. xxiv.

† Cl. Méd. obs. xix. xxxii.

sions may be readily recognized by absence of respiration and resonance, and sometimes even by ægophony, over their site, when they are of a certain extent. I have perceived ægophony in cases in which the effusion did not exceed a few ounces. Andral met with it also in the case of a more considerable effusion confined between the diaphragm, the basis of the lung, and the mediastinum (Cl. Méd. obs. xxxii.) However, when ægophony is wanting, and if a stitch did not exist at the commencement, it may be very difficult to distinguish a partial pleurisy from a large tumour in the substance of the lungs.

Sect. VIII.—*Of latent Pleurisy.*

Several physicians of the last century, and particularly Stoll, had remarked, that, in many cases of pleurisy, the stitch, which commonly attracts attention to the character of the disease, is altogether wanting; and that the insidious mildness of the whole symptoms, in the early stage, is such as not even to excite any suspicion of a severe affection. Notwithstanding these hints, however, it cannot be denied, that, previously to the use of percussion and auscultation, many pleurisies which in the first instance were taken for trifling affections, in a later stage were regarded as consumptions, especially by the physicians who were not accustomed to seek in dissection for the tests of the truth of their diagnosis. It occurred to myself not many years since, to prescribe the operation of empyema in the case of a young man who had been put under my care as a consumptive subject *in extremis*, but in whose lungs, when examined after death, there did not exist a single tubercle.* Indeed the subject of latent pleurisy must be rendered much less difficult, by the details already given in this chapter; insomuch that I consider myself justified in asserting, that, to the physician who employs percussion and auscultation, these cases will be reduced to a very small number, and, in fact, will consist only of such as it is of little practical importance to distinguish. These will be the following: —1. a few partial pleurisies of small extent; 2. those which supervene during the last hours of most diseases, particularly phthisis and severe continued fevers, and for the most part in winter; and 3. the dry pleurisies, or such as are almost unaccompanied by effusion; all of which belong to the second class of cases, or to pleuro-pneumonia, with the predominance of pneumonia. These cases, moreover, are only recognized with difficulty, because of our unwillingness to disturb uselessly, the last moments of our patients; more particularly in exploring the posterior-inferior parts of the chest, where the effusion first shows itself.*

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* In this case the operation, in the first instance, proved very successful, insomuch that the patient, at the end of a fortnight, was able to walk abroad; and although the progress of the cure was subsequently checked by frequent excesses at table, the flesh and strength nevertheless returned completely. At the end of the eighth month, there existed only a small fistula into which one or two spoonsful, at most, could be injected. The patient now thought it incumbent on him to celebrate his recovery; and terminated his fete by being carried from the table dead-drunk, together with the whole of his guests. This debauch was followed by a severe fever accompanied by delirium, during which he would not permit the wound to be dressed; and when it was examined, at the end of a fortnight, the pleura was found detached, and the cavity so enlarged as to be capable of receiving a pint of injection. From this time the suppuration assumed a bad character, emaciation returned, and the man died, worn out, after a few months. *Author*.

SECT. IX.—*Treatment of Pleurisy.*

In acute pleurisy, when the patient is strong and plethoric, venesection has been uniformly recommended by the best practitioners of all ages.† Should the pain and fever not yield to the first or second bleeding, however, it will be better practice in this, as in all other inflammations of serous membranes, to follow up the cure by local bleedings. These, generally speaking, must be continued until the pain and fever go off; and must be repeated should they afterwards return. Cupping, in these cases is, in my opinion, preferable to leeches, and for many reasons: by the former method we can take away the exact quantity of blood which we want, while the operation is at the same time much quicker and less painful. Leeches are often very tedious and painful in their action; sometimes they scarcely fill themselves with blood, and at other times their punctures will continue bleeding for twenty-four hours, and can only be closed by the cautery. I am acquainted with recent (and even fatal) examples of this accident, which has occurred in different hospitals,—and which might have been safely left to nature.* During the first days of the disease, the patient (unless an infant) ought to receive no food; but should be allowed some liquid aliment, at least, after three or four days. This indulgence is the surest way of escaping those interminable convalescences, occasioned by the passage of the pleurisy into the chronic state. Sydenham's practice of getting the patient out of bed, if he can bear the fatigue, and of keeping him up several hours every day, is very proper; and has frequently appeared to me to contribute powerfully towards subduing the inflammation.—I shall say nothing in this place of the various topical applications, hot or tepid, dry or moist, which were formerly cried up as remedies in pleurisy. These rarely afford any relief; and the humid applications, in particular, are frequently more injurious than useful, from their becoming cold. When the stitch does not yield speedily to the general and local bleedings, some practitioners are in the habit of applying a blister over the affected part, and sometimes of keeping up the discharge from it. I have sometimes thought that the use of this remedy, in a very early stage of the disease, was immediately followed by an increase of the pleuritic effusion; and I cannot consider the practice as advisable, until after the complete cessation of the pain for several days, and unless the progress of the absorption is slow, and the disease threatens to become chronic.—Tartar emetic in large doses, is commonly very well borne by patients affected with pleurisy, and I am in the habitual employment of it in this disease as well as in pneumonia. It contributes powerfully, in most cases speedily, to subdue the inflammatory action, and does away with the necessity of abstracting so large a quantity of blood. However, when the violence of the fever and the stitch have ceased, it loses almost all its power over the disease; or, at least, it retains a little of its admirable efficacy, even although the system bears its employment very well. I have often continued its administration in a dose of nine grains [per diem] for several successive weeks without its having any apparent effect in accelerating the absorption, and indeed without any effect whatever on the system. For these reasons I now restrict its employment to the acute stage. The practice of giving antimonials in pleurisy has been much in use. Stoll and his disciples were in the almost constant habit of giving the tartar emetic in the commencement of the dis-case, to produce vomiting; and a vast number of practitioners have commended the use of kermes in frequently repeated doses.[*]

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* Pleurisy in some one or other of its forms, has in all ages attracted the marked attention of practitioners: on this account its literature is extremely extensive. For a list of the best works of the older writers on the subject, I refer the reader to Dr. Young's Medical Literature, 2nd Ed. p. 231. In these the student will obtain much information respecting the general symptoms and treatment of pleurisy; and, after studying the real pathology of the disease in our author, will derive much practical information from the perusal of them. The only works, however, which, in a pathological point of view, can at all bear comparison with the admirable account given by M. Laennec in the present chapter, are those of Broussais and Andral. See *Phlegmasies Chroniques*, t. i. p. 220: *Clinique Médicale*, t. ii. p. 85. Compared with these works it is but simple justice to state, that all our English writings relative to the *pathology* of pleurisy sink into insignificance. The earlier authors best deserving the student's attention on the subject of pleurisy are Stoll, Morgagni, Baglivi, Wendt, Triller, Hoffmann, Huxham, Cleghorn, Frank, &c. For some valuable remarks on the chronic form of the disease, I refer to Dr. Armstrong's Treatise on Scarlet Fever, p. 193; to Dr. Abercrombie's Essay on the Pathology of Consumptive Diseases, Edin. Journ. vol. xvii. p. 29; and to Dr. Hastings's paper on Empyema already noticed. I would also refer the reader to the excellent articles on pleurisy in the *Dict. de Scienc. Méd.* t. xliii. p. 185, by Pinel and Bricheteau; the *Dict. de Méd.* t. xvii. p. 127, by Chomel; and *The Cyclopædia of Practical Medicine*, by Dr. Law. Of these the essays by M. Chomel and Dr. Law may be recommended to the student as admirable epitomes of all that is known respecting the pathology of this disease.—*Transl.*

† In females, near the period of the catamenia, the blood has been by preference, and properly, taken from the foot.—*Author.*

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* The danger of bleeding from leech-bites, *in adults*, at least, is here much exaggerated. One of the many practical advantages of accurate diagnosis in pleurisy and pneumonia, is the much greater benefit derived from local bleeding in the former than in the latter disease. I believe we are accustomed in this country to trust too much to general and too little to local bleeding in this disease: both combined in moderation are greatly preferable to either in excess.—*Transl.*

To the means above mentioned we must add calomel and opium, so strongly recommended by Dr. Robert Hamilton, to whom we owe the employment of the same remedies in hepatitis, peritonitis, and, indeed, in most inflammatory diseases. I have myself hardly any experience of this practice in pleurisy; as I generally give the preference to mercurial inunction carried to a considerable extent. There exists no doubt in my mind, that mercury aids the resolution of inflammatory diseases, even such as are chronic; and I have proved their utility in promoting absorption subsequent to pleurisy.[†]

The means now enumerated, suffice, in most cases, to subdue the inflammatory action and fever, and even to establish perfect convalescence. But it must be admitted, that, in this as in most acute diseases, the unaided resources of nature are very great: and that the greater number of pleurisies, if left entirely to themselves, would do well. This much is certain, that a cure frequently takes place, when the treatment amounts to almost nothing, or even when it is conducted on principles opposed both by reason and experience. It is even now by no means uncommon, particularly in country places, to meet with persons who attempt the cure of pleurisy according to the sudorific plan of Paracelsus and Vanhelmont, that is, with hot wine or brandy and aromatics, such as pepper, ginger, cinnamon, and juniper or coriander berries; the dung of horses or sheep infused in wine, &c. And yet all the patients of these sages do not die; a salutary crisis occasionally triumphs over both the disease and the treatment. The most common kinds of crisis in pleurisy, are those by urine, sweat, or hæmorrhage: diarrhœa is also frequently critical; a crisis by expectoration is more rare, and only occurs in the case of pleuro-pneumonia. In some instances, an erysipelas, a miliary or some other cutaneous eruption, and even jaundice, has proved critical; and the same thing has sometimes been observed of salivation and inflammation of the parotids. As a general rule in pleurisy, pneumonia, and other cases of pure inflammation, it may be stated, that we ought neither to disregard (much less disturb by too active treatment) an incipient crisis, nor yet lose precious time in waiting for it.

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[*] Tartar emetic in large doses is a bad remedy in pleurisy: its benefit is very equivocal, and it sometimes gives rise to serious metastases. In one case, in the Clinic of La Charité, I witnessed this transference of inflammation to the pericardium and arachnoid. If we make use of antimonial medicines in this case, we ought to confine ourselves to the white oxyd, as was done by the ancient physicians of La Charité, as in the famous potion *in pleuritide.*—(*M. L.*)

My own experience leads me to join in the condemnation of tartar emetic in large doses, in pure pleurisy: nothing can be more striking than the difference of effect of this potent remedy in this disease and in pneumonia; and nothing can place in a stronger light the importance of the means which tend to discriminate the two diseases in practice.—*Transl.*

[†] See note, page 229.—*Transl.*

When the fever and pain have ceased, the disease then enters the chronic stage, or that of absorption, which is seldom of less than a month's duration, and may sometimes extend to two years, as formerly mentioned. It is at the beginning of this period that blisters to the affected side may be employed with advantage; later in the disease a seton is preferable. We must at the same time assist the absorption of the fluid by purgatives and diuretics. Acute pleurisy become chronic has a great analogy with dropsy; and indeed it was only by confounding these two diseases together, that hydrothorax was considered so common an affection by several physicians of the last century. To be useful, purgatives ought to be pretty frequently repeated. They are particularly indicated, subsequently to blood-letting, when the abundance of the effusion, or the rapidity of its formation and the general symptoms, give reason to presume that the pleurisy is hæmorrhagic. It was justly remarked by Sydenham, that purgatives afford the best means of checking hæmorrhage, after the vessels have been emptied by blood-letting. Diuretics seem to have no evident effect upon the absorption unless they are given in larger doses than is customary. I am in the habit of carrying the acetate of potass to the extent of six drachms, or even to two ounces, in the day. In like manner, I gradually increase the dose of nitre from forty grains to three or four drachms, if the patient bears it well: and with this latter salt I sometimes combine sal ammoniac, according to the method of Triller. I have sometimes also given, with advantage, the extract of squills, as recommended by Quarin, viz. in a minimum dose of two grains every three hours. If the effusion has been of long standing, and there is no hectic fever present, it is often of use to combine bitters with our diuretics, and to administer them in white wine, as in the formula known by the name of *the bitter and diuretic wine of La Charité.** Immediately after the acute stage, I prefer the watery infusion of digitalis, beginning with the dose of eighteen grains, (to the pint of water,) and gradually augmenting it to half a drachm or more, if the patient bears it well. I have occasionally used with benefit *urea*, in doses of twelve grains daily, gradually increased to a drachm and more. In respect of diuretics generally, it may be said that the mode of evacuation by them is, next to that by sweat, the least under the command of medicine. Sometimes, however, they are wonderfully successful. Two years since, I had occasion to see, in consultation with MM. Cayol and Marjolin, a child, who had laboured under pleurisy for several weeks, and in whom the effusion was so copious as to impress us, at first, unanimously, with the necessity of the operation of empyema. I however proposed to make trial of nitre in large doses; and was gratified to find, at the end of twenty-four hours, that the oppression was perceptibly less, under a copious flow of urine which had been excited: during the following days, the dilatation of the affected side rapidly diminished, and the patient eventually recovered without any operation.

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* According to the formulary of Ratier (p. 334) this is made by the infusion of the following articles in two pounds of wine for twenty-four hours, viz. Winter's bark, cinchona, cinnamon, of each an ounce; angelica, squills, juniper berries, mace, of each two ounces; leaves of wormwood and balm, of each two handfuls. The dose is said to be from one to four ounces daily.—*Transl.*

The treatment of pleurisy which is chronic from the beginning,[*] does not differ materially from the acute disease become chronic; and indeed we must be contented with the same means, although the affections are of very different severity. Sometimes in the beginning of this species, we may take away blood with benefit, if pain is occasionally present, and if the fever is considerable, though of the hectic character. But we must be on our guard not to pass the just limits; and weaken unnecessarily a constitution already too much enfeebled. Small local bleedings are in general sufficient; and it is better to repeat these occasionally than to make them too copious. Blisters, caustic issues, and particularly setons, on the affected side, are still more indicated in this variety than in that which had been originally acute: and it is also in this case, more especially, that we must combine tonics with our diuretics, particularly bitters and those denominated anti-scorbutics.

Of Empyema and the operation of Empyema.—The name of empyema was originally applied by the ancients to every collection of purulent matter; it was subsequently confined to effusions into the pleura and abscesses of the lungs; and is now applied by modern surgeons to effusions into the pleura only: hence the names of empyema of pus, of blood, of water and air, are often used as synonymes of pleurisy, hæmothorax, hydrothorax, and pneumothorax. With the exception of that last named, these diseases give rise to symptoms very much alike. The signs by which we are guided in determining upon the operation of empyema, are chiefly these:—the dilatation of the affected side; œdema of the same side, and arm, or the proportionally greater œdema of these parts when the affection is general; depression of the liver; displacement of the heart towards the side free from fluid. We have already shown that all these signs (which on examination will be found referrible to one cause, viz. dilatation of the affected side) may be wanting; and it even frequently happens that at the very time when an operation is proper, the affected side, although full of pus, is smaller than the opposite one, in consequence of the absorption which has already taken place, and the contraction consequent to this. But in all cases of this kind, the results of percussion and auscultation leave no doubt respecting the existence of the effusion.

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[*] I make use of this expression for want of a better, although I am well aware of its incorrectness.—*Author.*

There are two cases of pleurisy in which the operation of empyema ought to be performed. The first is when, in an acute pleurisy, the effusion is very copious from the beginning, and increases so rapidly as to give rise, after a few days, to a general or local anasarca, and to threaten suffocation. This is the case which I shall designate *acute empyema*.* The second case is that which I term *chronic empyema*, and is either the consequence of a pleurisy essentially and originally chronic, or of the acute disease degenerated to this state. In such circumstances, when œdema of the affected side has come on, when the long continuance of the disease, the progressive emaciation and debility of the patient, and the failure of every measure employed to produce absorption, leave us nothing to expect from other means, we are justified in having recourse to the operation. This operation, however, is rarely followed by success, owing to various causes, all of which are not equally well understood. 1. The first of these, is the bad condition of the lung itself, this being frequently tuberculous. This is no doubt a very serious evil; but it ought not to be considered as amounting to an absolute prohibition of the operation; even in the case where pectoriloquy is discovered in the upper lobe of the compressed lung, provided the other be sound: what was formerly stated respecting the possibility of curing phthisis, and some facts to be noticed hereafter, suffice to prove, that we must not abandon all hope of cure even when there exists so serious a complication as this. 2. The irritation produced on the surface of the pleura, by the admission of air into the chest, has particularly engaged the attention of surgeons, who have chiefly referred to this cause the great and offensive discharge which too often succeeds the operation, and carries off the patient. There can be no doubt that the admission of air into the chest affects the action of the organs contained in it; but, in the present case, its immediate impression is not on the pleura. In the case of acute pleurisy, or such as was so originally, the pleura is invested with a false membrane; while in the chronic variety, there is at least a layer of thick pultaceous pus between it and the air. But even in the event of actual contact, the air could only at most give rise to a more acute state of inflammation, which would not in itself prevent the cure. On the contrary, the false membranes thereby produced, being susceptible of transformation into serous tissue, might unite the pleura pulmonalis and costalis together, and thereby tend to facilitate the recovery. 3. But the cause which, in my opinion, affords the greatest obstacle to the success of the operation, is the compression of the lung against the spine and mediastinum, and the nature of the investing false membrane. The viscus, from long compression, has lost its elasticity and expansibility; it is penetrated with difficulty by the inspired air, and only recovers very slowly the dimensions which it had before the disease. It never, indeed, returns to its original size. (See the section *On Contraction of the Chest.*) If the investing false membrane is of the kind which has a tendency to be converted into fibrous tissue, as happens in the case of hæmorrhagic pleurisy, the dilatation of the chest becomes more difficult still; as it cannot take place unless this very strong membrane relaxes and gives way, which can only be a work of time. Meanwhile the atmospheric air continually irritates the exhalent surface of this partially organized membrane, and excites a purulent discharge so copious as to exhaust the patient's strength, while it is productive of no local benefit, the parts being still too far apart to be agglutinated. For this reason, the acute empyema affords more chance of success than the chronic; and the variety of the latter, which is chronic from the beginning, affords a better prospect than the acute degenerated to this state, although the condition of the fluid in the former seems more unfavourable.

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* For a strongly marked case of this kind, and one in which I have never ceased to regret the non-performance of paracentesis, I refer the reader to Case XXV. in "Original Cases," &c. p. 215. I have denominated this disease Idiopathic *Hydrothorax*, but it will be seen from the *Remarks* appended, that I considered it at the time to be the case described in the text.—*Transl.*

The mode of operation commonly employed at present does not seem susceptible of much improvement. I presume no one will ever think of reviving the perforation of the rib employed by the followers of Hippocrates, since it has many disadvantages peculiar to itself, and no advantage over the common methods. Puncture of an intercostal space by means of a trocar has been repeatedly had recourse to. It was employed by Morand, among others, without success. M. Recamier has several times performed this operation, using a very small trocar; and I have myself repeatedly done so, but without ever having obtained any permanent benefit from it. This operation, however, is not attended by any inconvenience, and gives always temporary relief, —but only temporary. As soon as the instrument is withdrawn, the adaption of the wound of the skin and of the intercostal muscles is destroyed: no discharge takes place; the wound heals entirely in the course of a few days, and the chest fills anew. If this measure should ever prove successful, I think it will be in cases of acute empyema, in which successive punctures might, perhaps, at once aid the absorption, and accelerate the conversion of the false membranes. There are two other cases in which I willingly have recourse to puncture: 1st. when the patient is so debilitated, as to occasion apprehension lest the complete discharge of the fluid might occasion a dangerous syncope: 2nd. as a means of relief in cases which are incurable, on account of the co-existence of numerous tuberculous excavations. When there exists considerable œdema of the side, it is sometimes impossible to perform this operation from the inability of the surgeon to distinguish the intercostal spaces.

The place of election, commonly adopted by surgeons, for this operation, is the most dependent point in the anterior and lateral parts of the chest. This rule, however, cannot hold good constantly, since the most dependent point varies with the position of the patient. The natural posture of a patient affected with empyema is to lie on the diseased side; and in this case the most depending point is the space between the fifth and six ribs. Many other reasons point out this spot as being the best suited for the operation. For instance, we know that the upper lobe adheres to the ribs more frequently than any other part of the lungs, and that the lower lobe is frequently attached to the diaphragm. On the right side, we know that an enlarged liver frequently reaches as high as the sixth or even the fifth rib; and that, on both sides, the thickest false membranes, and consequently adhesions, exist at the junction of the diaphragm with the walls of the chest. Finally, we know that the greatest portion of the effused fluid is collected about the middle of the side. The intercostal space mentioned ought, therefore, to be preferred, and the best point is a little anterior to the digitations of the serratus major. Should there chance to be any old adhesions in this point, we shall readily and certainly discover them by means of some remains of respiration over their site. If, then, we are assured, by repeated examination, that the sound on percussion is dull over this point (or indeed over any other) and that the sound of respiration is wanting, we may safely make an incision, and with less caution and slowness than are commonly used. I formerly showed that the fear of wounding an adherent and compressed lung has been exaggerated. I am well assured that this operation will become more common, and more frequently useful in proportion as the employment of auscultation is extended. This method of exploration, either singly or conjoined with percussion (and sometimes with succession), enabling us to recognize effusions at their origin, we have it thereby in our power to operate early and consequently with greater chance of success. Hitherto, in fact, the simple empyema and idiopathic hydrothorax have never been distinguished until the disease was of long standing and of great extent; and, indeed, even in this period of their progress, these affections have frequently escaped the notice of the best informed physicians and surgeons: how much more likely, then, are the slighter cases which offer most chance of success, to be overlooked? I do not think I go too far, when I assert that, in the state in which the science was left by Avenbrugger and Corvisart, empyema was not recognized until after the effusion had become very great, or unless it had been perceded by the symptoms of manifest pleurisy. It has lately occurred to me, from witnessing the effect of the piston cupping-glass, that the employment of this instrument might perhaps enable us to overcome the chief obstacle to the success of the operation, viz. the difficulty of procuring the expansion of the compressed lung. Accordingly, I have it in contemplation, at the first opportunity that offers for performing the operation of empyema, to apply the exhausting glass over the wound, immediately after the discharge of the liquid, and to produce a vacuum in the chest, more or less quickly, continuously, and completely, according to the effects; taking care to defend the skin from the pressure of the glass by interposing a piece of leather, and by using in succession glasses of different diameters.*

SECT. X.—*Of Pleuro-pneumonia.*

Pleurisy is frequently conjoined with pneumonia; and it is no doubt from this circumstance, that these diseases have been so long confounded. However, even in the cases in which they are conjoined, it frequently happens that one of the affections is so much more violent than the other, as to render the latter a complication of hardly any consequence. On this account, we can distinguish in practice three different varieties of pleuro-pneumonia, which present real differences in their progress, and in the mode of treatment best suited to them. These are—1. pneumonia complicated with slight pleurisy; 2. pleurisy complicated with a slight pneumonia; and 3. pleuro-pneumonia, properly so called, in which both affections exist in a nearly equal degree.

1. *Pneumonia complicated with slight pleurisy.*—There are few examples of simple pneumonia, if by this term we understand such only as are unaccompanied by false membranes on any part of the pleura pulmonalis or costalis, or by serous effusion even

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* For a minute and most elaborate history of the operation of empyema, from the earliest times, I refer the reader to Sprengel's History of Medicine, vol. ix. p. 1; and for a very complete and scientific view of the whole subject, in the actual state of our knowledge, I refer him to the article *Empyema* in *the Cyclopædia of Pract. Med.* written by Dr. Townsend, a most able physician and practical auscultator. The subject is treated of by all our best surgical writers; and I would particularly refer the student to the following works: Sharp's Critical Enquiry; Warner's Cases in Surgery; Kirkland's Medical Surgery: White's Surgery; Hey's Practical Observations; Pearson's Principles of Surgery; C. Bell's Operative Surgery; to many cases in the various Medical Journals, and particularly to the papers of Dr. Hastings and Mr. Jowett referred to in a former note. The last named writer proposes to revive, on an improved plan, the method of removing the fluid by means of a syringe, as formerly recommended by Scultetus and Anel; (See Jourdan's translation of Sprengel, t. ix. p. 23. 35;) a proposition that seems to hold out many advantages, in certain cases. This plan, if successfully put in execution, will do away with the necessity of the more problematical suggestion in the text, of attempting to elevate the compressed lung by means of an air-pump.—*Transl.*

in small quantity. In almost every case of pneumonia, when the inflammation reaches the surface of the lungs in any point, the contiguous portion of the pleura inflames and becomes invested with an albuminous false membrane. This membrane is usually thin, and is frequently confined exactly to that portion of the pleura pulmonalis which corresponds with the hepatized space that has reached the surface. In this case the inflammation seems to have a greater tendency to propagate itself by contiguity than by continuity; since we frequently find a false membrane of the same kind on the corresponding portion of the costal pleura. If the hepatization occupies only a part of the lung, it is accompanied by a slight sero-purulent effusion; but if nearly the whole lung is so affected, then there is no effusion whatever: only we observe on its surface a very thin and imperfect false membrane, thicker along the edges and in the interlobular fissures, and also in some other points, where the inflammation had first reached the surface. This is the most common variety of what is called dry pleurisy; but it is to be remembered that in cases of this kind, the pleurisy is evidently a mere accidental consequence, of little importance in itself, and scarcely at all modifying the severity or the progress of the pneumonia. In this particular state of the disease, it would be extremely difficult to distinguish the pneumonia from a pleurisy with copious effusion, if we had not seen the patient before this period: we should have here as complete an absence of the thoracic resonance as if the whole surface of the lung were covered by a pleuritic effusion, while the stitch, which is by no means uncommon at the time when the inflammation reaches the surface of the lung, would further lead us to suspect an affection of the pleura. However, even in these circumstances, it is still in our power to obtain a more accurate diagnosis. When the lung is completely hepatized, without any accompanying effusion, there exists always a strongly marked bronchophony, almost like pectoriloquy, in different points, and particularly towards the summit and roots of the lungs,—a thing which never exists in the same degree, or over the same extent, in pleurisy or pleuropneumonia. If we have had opportunities of seeing the patient from the origin of the disease, the diagnosis will be much more easy; or, rather, any mistake will be impossible. In the case of pneumonia, the existence of the crepitous rhonchus previously to the complete disappearance of the respiratory murmur, and the gradual diminution of the sound on percussion, will leave no doubt of the nature of the affection: in pleurisy, the loss of resonance is sudden or almost without gradation, and exists at once over the whole of the affected side, at least in cases in which the lungs had been previously healthy and without adhesions. Moreover, in the case of pleurisy, ægophony is always perceptible, at least for one or two days.

2. *Pleurisy complicated with slight pneumonia.*—In the case of a severe pleurisy, attended by an effusion sufficiently abundant and rapid suddenly to compress the lung upon its roots, it is by no means uncommon for an inflammation of some points of the pulmonary substance to arise at the same time, particularly in the lower lobe. These points of inflammation frequently remain distinct, and consequently of small extent; and constitute one of the varieties of the affection which has been termed *lobular pneumonia* by some recent observers. The pulmonary inflammation is here very remarkably modified by the pleuritic effusion. The compression produced by this, clearly moderates the inflammatory action; and it is no doubt owing to this cause that in the present case more than any other, the phlogosis remains confined to some particular lobules. It also very rarely reaches the suppurative stage; its resolution is much slower; and its anatomical characters are quite peculiar. The hepatized parts are here in the first instance much more flabby, and less solid than in simple pneumonia; and become converted into a substance completely resembling, both in appearance and consistence, muscular flesh, which has been beaten to make it tender. In this state it has of course lost the granulated surface characteristic of hepatization; it is completely flabby, and is of a red or violet colour, sometimes with a tint of greyish. This is the lesion to which I give the name of *carnification*, a term which has sometimes been very improperly applied to common hepatization. I have constantly met with it in the case in question, and never in any other. I am, however, disposed to believe, that the imperfect resolution of the hæmoptysical infarction, when complicated with pleuritic effusion, sometimes produces the same effect. Pulmonary substance thus *carnified*, presents a homogeneous texture, is supple and compact, and retains no trace of air-cells: it, however, still exhibits the ramification of the bronchial tubes and vessels. It is as dry as muscle, and does not contain a particle of air. The resolution of the inflamed lung is much slower under the influence of the pleuritic effusion than in other circumstances; as I have sometimes found the state of carnification very strongly marked, after all symptoms of pneumonia had disappeared for more than two months. In proportion, however, as the resolution is near its completion, the carnified spot becomes first paler, then violet-pale, and finally flaxen-grey; while the original vesicular texture of the healthy viscus is simultaneously developed. I have very rarely had an opportunity of observing the traces of resolution when the inflammation had reached the stage of purulent infiltration, under the influence of a pleuritic effusion. However, in some instances of pleuro-pneumonia, and in subjects who had died of some concomitant affection, one, two, or even three weeks after the complete cessation of every inflammatory symptom, and, indeed, of every sign of pleurisy except such as

depend immediately on the presence of a fluid in the pleura,—I have found the affected portions of the lung flabby, dry, and yellowish, with the vesicular structure discoverable in some points, but the vesicles apparently filled with a half-concrete pus.

When a pneumonia, even slight, supervenes to a pleurisy with copious effusion, it is almost always recognized by means of the crepitous rhonchus, which is usually observed towards the root of the lungs, under the scapula, in the axilla or a little beneath the clavicles, that is, in the parts of the lungs which are with most difficulty compressed by the effusion.—It is, moreover, to be remarked in this place, that the complication just described can only take place at the onset of the disease, and when the effusion is still small in quantity; since we know that a lung thoroughly compressed is no longer susceptible of inflammation. And this case is analogous to others met with in practice. When a violent inflammation is produced by a sprain, or luxation, or burn, the application of a compressing bandage is a sure means of moderating, in a great degree, the intensity and extent of the inflammation; and the same result has been frequently obtained in erysipelas.

3. *Pleuro-pneumonia, properly so called.*—The conjunction of an inflammation of the whole or a part of the pleura with pretty copious effusion, and a severe pneumonia, is a much rarer case than either of the two just described. Pleurisy conjoined with pneumonia does not increase the danger of the latter; on the contrary, it lessens it, as we have just stated, by exerting a compressing force on the lung. On the other hand, the pneumonia at first augments the danger of the pleurisy, (which is rarely fatal in the acute stage,) but it occasions a more rapid absorption of the effusion, by preventing this from being so copious as in simple pleurisy, the inflammation rendering the lung less compressible. *Cæteris paribus*, then, pleuro-pneumonia ought to be regarded as less dangerous than either the simple pleurisy or pneumonia; and I think this opinion is supported no less by experience than by reasoning.

Pleuro-pneumonia is easily recognized by the re-union of the signs of pleurisy and pneumonia. Some of the pathognomonic signs are even more permanent in this, than in either of the simple affections, for the reason, just stated, that they mutually impede and retard one another's progress. We thus often observe the crepitous rhonchus on the one hand, and ægophony on the other, up to the period of convalescence. In cases of this kind ægophony is seldom simple: it is perceptible only at the root of the lungs around the lower angle of the scapula; and, on account of the vicinity of the large bronchial trunks and the density of the pulmonary substance, it is usually combined with a marked bronchophony. This case of the conjunction of these two phenomena, is that in which we frequently observe the complete resemblance to the squeaking of Punchinello.*

The treatment of pleuro-pneumonia must be regulated according to the predominance of either affection. I shall, therefore, content myself with referring to what has been already said respecting these individually.†

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* M. Chomel notices a case of pleuro-pneumonia, in which the crepitous rhonchus was only perceptible during the inspirations which succeeded the effort of coughing. The rhonchus was accompanied by ægophony, the bronchial respiration, &c. and denoted, according to M. Chomel, that the affection of the pleura corresponded exactly with that of the lungs. (*Dict. de Méd.* t. xvii. art. *Pneumonie.*) This conclusion appears to me by no means justifiable; for every one has had occasion to notice cases in which not merely the crepitous rhonchus but also the cavernous rhonchus and indeed all the varieties of the bronchial rhonchus, were perceptible only during fits of coughing. All that is necessary to produce this result, is, that the part affected lies deep and at a distance from that to which the ear or instrument is applied. Thus we often observe the same thing in lobular pneumonia, which is usually central, more particularly if there exists, at the same time, a pulmonary catarrh. M. Chomel's remark is not therefore new; and indeed it had been previously made by Laennec; nay, more, it might have been, that the supposed pleuro-pneumonia of M. Chomel, was only a simple pneumonia which had reached the stage of hepatization at the circumference of the lungs, but was less advanced towards their centre,—from which condition of parts would result the bronchial respiration and bronchophony (taken for ægophony) from the surface, and the crepitous rhonchus from the deeper parts,—which last, owing to its remoteness, would only be perceptible during the fits of coughing —(*M. L.*)

† LITERATURE OF PLEURISY.

1537. Turinus (A.) De Curatione Pleuritidis per venæsectionem. *Basil.* 4to.
1549. Arma (J. F.) De Pleuritide. *Ferrara.* 8vo.
1562. Bulleyn (W.) Regiment against the Pleurisie. *Lond.* 8vo.
1564. Cassanus (F.) De Venæsectione in Pleuritide. *Patav.* 12mo.
1622. Moreau (R.) De Missione sanguinis in Pleuritide. *Par.* 8vo.
1634. Benedictus (J. C.) Tutelaris columna, qua statuitur pleuritidem fieri dum una pulmonis ala afficitur. *Rom.* 4to.
1641. Moreau (R.) De loco affecto in Pleuritide. *Par.* 8vo.
1657. Fontanus (G.) Apologeticon circa Pleuritidis ideam, &c. *Lugd.* 4to.
1664. Diemerbroeck (J. de) Disput. Pract. De morbis capitis et thoracis. *Utr.* 12mo.
1672. Banda (A.) Discours contre l'abus de la Saignée dans les pleurisies. *Sed.* 8vo.
1683. Bellini (L.) De Urinis el Pulsibus . . . De morbis capitis et Pectoris. *Bon.* 4to.
1686. Baronius (V.) De Pleuripneumonia Flaminiam infestante. Lib. ii. *Forol.* 4to.
1690. Knisel (J. S.) Historia Pleuritidis et abscessus pectoris. *Tub.* 4to.
1692. Campen (C. Von.) Collectanea de pleuritide et apoplexia. *Breda.* 8vo.
1701. Fonseca (Rod. A.) Pleurologia, de Pleuritide ejusque curatione. *Lisb.* 4to.
1702. Pascoli (A.) Observationes de pleuritide. *Venet.* 8vo.
1713. Verna (J. B.) Princeps Morborum Acutorum Pleuritis. *Venet.* 4to.
1735. Camerarius et Seeger. De Pleuritide maligna, (Hal. Dis. II.)
1740. Triller (M. A.) Succincta Comment. de Pleuritide. *Francf.* 8vo.
1742. Tennent (J.) Epist. to Dr. Mead on the Pleurisy, &c. of Virginia. *Edin.* 12mo.
1759. Bouillet (J. H. N.) Mémoire sur les pleuro-peripneumonies épid. *Beziers.* 4to.
1761. Zeviani (G. V.) Della Rachitide e della Pleuritide. *Verona.* 4to.
1762. Flemyng (M., *M.D.*) Adhes. of the lungs to the Pleura considered. *Lond.* 8vo.
1779. Musgrave (S., *M.D.*) Gulstonian Lectures.—II. On Pleurisy, &c. *Lond.* 8vo.
1786. Triller (D. W.) Abhandlung vom Seitenstechen. *Leips.* 8vo.
1789. Saalmann (F., *M.D.*) Descriptio Pleuritidis, &c. *Mon. W.* 8vo.
1790. Sachtleben (D. W.) Bemerk. ueber brustenzundung. *Goett.* 8vo.
1791. Fiorani (A.) Saggio sopra la pleuritide biliosa. *Firenze.* 8vo.
1793. Maschke (G. T.) Historia litis de loco V. S. in Pleuritide. *Hal.* 4to.

CHAPTER II.

OF HYDROTHORAX.

THIS disease is considered by many practitioners, and by extra-professional persons generally, as a very common disease, and a frequent cause of death. When truly idiopathic, however, and existing in a degree sufficient to occasion death by itself, I consider it as one of the rarest diseases; and do not think we are justified in rating its fatality higher than one in two thousand deaths.* I have often seen practitioners, who were but imperfectly acquainted with morbid anatomy, and consequently very ignorant of diagnosis, mistake for this affection hypertrophy of the heart, aneurism of the aorta, irregular consumption, and even scirrhus of the stomach or liver,—when there was no co-existing effusion into the pleura, or, at least, none other except what took place immediately preceding death. Corvisart formerly pointed out these mistakes, particularly in regard to the two first-named diseases. One circumstance which has more especially led to the belief of the frequency of this disease, is the common mistake of taking a sero-purulent effusion for it. This has arisen from the transparency of a part of these effusions. Indeed, it is only within these few years that the nature of the pleuritic effusion has been properly known; and the mistake we have mentioned has been made by men of great eminence at no very remote period. For example, Morand gives under the name of *dropsy of the chest,* a case of pleurisy cured by the operation of empyema.†

1803. Conradi (J. W. H.) Pneumonie und Pleuritis in nosologischer und therapeutischer hinsicht. *Marb.* 8vo.
1803. Racine (C.) Rech. sur la pleurisie et la Peripn. latente chronique. *Par.*
1808. Broussais (F. J. V.) Phlegmasies Chroniques. *Par.* 8vo.
1820. Pinel et Bricheteau. Dict. des Sc. M. (Art. *Pleurisie*) t. 53. *Par.*
1826. Andral (G.) Clinique Médical, t. iii. *Par.* 8vo.
1827. Chomel Dict. de Méd. (Art. *Pleurisie*) t. 17. *Par.*
1834. Law. Cyclopæd. of Pract. Med. (Art. *Pleurisy.*) vol. iii.
Cullen. Burserius, Darwin, Frank, Pinel, Good, &c. *Transl.*

* Dr. Darwall goes further, and altogether denies the existence of such a disease as idiopathic hydrothorax. “There is no such disease (he says) as hydrothorax independent of inflammation of the pleura or organic disease of some other part.” (*Cycl. of Pract. Med.* vol. ii. p. 519.) This, I think, is carrying the point too far, although I fully coincide with Laennec as to the extreme rarity of the idiopathic affection.—*Transl.*

† Mém. de l'Acad. de Chir. tom. ii. p. 545.—Our periodical literature abounds with mistakes of this kind: see a remarkable instance in the Edin. Journ. vol. xvi p. 529. See also Good's Study of Medicine (*hydrothorax*) where the same mistake is committed.—*Transl.*

SECT. I.—*Of Idiopathic Hydrothorax.*

Idiopathic hydrothorax commonly exists only on one side. Its anatomical characters are simply an accumulation of serum in the cavity of the pleura; this membrane being quite healthy in other respects; and the lung being compressed towards the mediastinum, flaccid, and destitute of air, as in cases of pleuritic effusion. When the effusion is very great, the affected side is evidently larger than the other. I have seen this when there was no other dropsical affection, nor any organic lesion to which it could be attributed. In one case of this kind the right pleura contained twelve pounds of a colourless and limpid serum, and seemed in other respects quite healthy.

Signs and symptoms.—The chief and almost the only symptom of this disease is the impeded respiration. Percussion affords the dead sound, and the stethoscope indicates the absence of respiration every where except at the roots of the lung. At the time of the publication of the first edition of this work, I imagined that ægophony ought also to exist in this case; and since then I have more than once proved the correctness of this opinion. This was the case in the two following examples:—1. Last year a woman came into the hospital with every sign of hypertrophy and dilatation of the heart, and of an effusion in each side of the chest. The effusion was, in particular, very abundant on the left side. In this case ægophony was distinct on both sides. As there was neither fever nor stitch present, I looked upon the effusions as serous, and prescribed the acetate of potass, to the amount of an ounce and an ounce and a half daily, and also nitre, in a dose increased from one to two scruples. This treatment proved so successful, that every sign of effusion disappeared in the course of eight days. During the present year, the same patient came once more into the hospital, affected with acute pleuro-pneumonia of the right side, and died there. On examination after death, the left lung was found perfectly free from adhesions. 2. The second case was that of a lady, whom I attended two years ago with MM. Recamier and Moreau de la Sarthe. She had been affected for several years with hypertrophy and dilatation of the heart; and during the last months of her life, she presented all the signs of an effusion into the pleura on the right side, and particularly a constant and very distinct ægophony at the roots of the lung, around the whole lower angle of the scapula, occasionally extending to the axilla. Upon examining the body, we found about a pint and a half of a perfectly limpid serum, occupying the lower two-thirds of the right pleura, which was in this place perfectly healthy, and without any false membranes, old or new. Above this, the pulmonary and costal pleura were united by means of a plentiful cellular tissue, which was strong, and obviously of long standing.

Its progress, and the state of the general symptoms, can alone distinguish this disease from chronic pleurisy. There are cases, even, where the distinction between these two diseases is difficult in the dead body. Whatever may be the difference, both in the general symptoms and the organic lesion, between a case of hydrothorax and an acute pleurisy; or between a case of ascites from general debility or organic disease of the heart or liver, and the same disease from an attack of peritonitis; or, in short, whatever may be the difference, in general, between a dropsy and an inflammation,—there can be no doubt that these two affections, so opposite in their extreme degrees, are nevertheless often very nearly allied in their slighter shades. We frequently find amid the serum of ascites or hydrothorax, filaments of a milk-white or yellowish colour and semi-transparent, formed of concrete albumen, almost as solid as false membrane. And we observe analogous facts in other diseases. Thus, for instance, it is not always easy to distinguish œdema of the lungs from the first degree of pneumonia. Again, we frequently observe prevailing at the same time, erysipelas, accompanied by a greater or less œdema of the neighbouring parts, and general œdema of the greater part of the body attended merely with a slight erythema: while in the inflammation of serous, mucous, and synovial membranes, a copious serous effusion always accompanies the extravasation of pus whether concrete or fluid: and the same thing is frequently observed in the inflammation of the cellular substance. These facts tend to explain the admission made, by certain authors, of inflammatory dropsies, and the fact of blood-letting being occasionally beneficial in dropsy, and injurious in diseases truly inflammatory.* This last is especially the case when the inflammation is of a chronic kind, or originates in a cause which is not within the controul of antiphlogistic treatment.

The causes of diseases are unfortunately, for the most part, beyond our reach, yet we learn from daily experience, that the particular character of the causes, occasions greater differences among diseases (especially as regards their cure) than the nature and kind of the organic lesions. Many cases of pleurisy and peritonitis are equally untractable by venesection, as a bubo or venereal ulcer, or as the local inflammation of gout, or that which precedes hospital gangrene.—I am far from calling in question the utility of the study of diseases according to their anatomical characters. This study, has, indeed, been my constant occupation, and this work is entirely devoted to the exposition of its results. I am of opinion that this study can alone constitute the basis of all positive knowledge in medicine; and that we can never lose sight of it in our etiological researches, without risk of pursuing illusions, and of creating phantoms in order to combat them. It is not given to all men to reach, like Sydenham, that high degree of medical tact, whereby we can safely disregard the details of diagnosis and direct our practice by the *indications* only: and I believe that this great man would have been still more distinguished as a practitioner, could he have applied to the morbid anatomy of diseases, the same talent for observation, which he showed in the study of symptoms and in the application of remedies. At the same time, I consider it no less dangerous to bestow such an exclusive attention on the local affections, as to make us lose sight of the causes whence they spring. The necessary consequence of this mode of proceeding, is to make us frequently mistake the effect for the cause, and to commit the still more serious error of considering as identical, and of treating in the same manner, all diseases which present the same anatomical characters. This error, which appears to be that of some practitioners of the present time, is to me quite inconceivable. It may perhaps be the consequence of a slight superficial attention to the study of morbid anatomy; but I consider it as impossible, that any person of good sense, who follows up this study carefully and without systematic prejudices, can continue long under such a delusion.

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* The great rarity of the true hydrothorax ought to make us cautious how we give this name to so many affections as we are accustomed to do; and the undoubted fact of a serous effusion being an almost uniform attendant on the inflammation of serous membranes, ought to make us slow to trust to mere diuretics and other similar remedies in cases wherein we have strong reason for suspecting dropsical effusion, especially in the chest. The now very generally allowed connexion between dropsy and inflammation, mentioned by our author in many parts of his treatise, is still much better understood in England than France. For ample and most valuable illustrations of this doctrine I refer the reader to the well-known works of Blackall, Parry, Crampton, and Ayre, and to the various articles in the Cyclopædia of Pract. Med. by Dr. Darwall, on the subject of Dropsy.—*Transl.*

SECT. II.—*Of Symptomatic Hydrothorax.*

The symptomatic hydrothorax is as frequent as the idiopathic is rare. The symptomatic dropsy may accompany almost every disease, acute or chronic, general or local: its presence almost always announces their approaching and fatal termination, and often precedes this only a few moments. It is not perhaps more frequent in cases of ascites and general anasarca than in other diseases. It is most commonly met with in persons who have died of acute fever, disease of the heart, or tubercles or cancer of different organs. Its symptoms, which are in every respect like those of the idiophatic disease, do not, in general, make their appearance but a few days, or even hours, before death. Nothing is more uncommon, even in organic affections of the liver and heart, attended by ascites and general anasarca, than to meet with the signs of hydrothorax so long as eight days before death. We may even consider this disease as peculiar to the moribund.* When the effusion takes place on both sides of the chest, it produces a very painful suffocation. Sometimes, however, we find a considerable effusion on both sides, in cases where there had been no very marked dyspnœa before death. Might not the effusion in such cases take place in the very moment of dissolution,—or even after death? We know that the functions of the capillary system do not cease immediately after death. I have sometimes found more than a pound of serum in the cavity of the pleura, in persons who exhibited no sign of effusion even a quarter of an hour before death: and twice or thrice, in cases of pleurisy, I have hardly found one or two ounces of serosity, although ægophony had been distinct during life. Is it not probable, in the first of these cases, that the effusion took place after death; and in the second, on the contrary, that a part of the effused fluid was absorbed in the mortal agony, or even after death?* The quantity of serum effused varies from a few ounces to one or two pints. It is commonly colourless or yellowish, sometimes tawny, reddish, or even bloody.

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* I cannot at all subscribe to this opinion of our author, as I have repeatedly treated cases of symptomatic hydrothorax which existed for months, and even years before death; and the true nature of which was not merely demonstrated by the physical signs, and by the relief afforded by diuretics, but by the state of the membranes after death.

In regard to the symptoms of hydrothorax, although it may be strictly true, as Laennec observes, that the chief and almost the only one is dyspnœa, still there are commonly present others which convey to the experienced practitioner, even although not an auscultator, a pretty strong assurance of the true nature of the disease. I will extract a few passages from Dr. Darwall's paper (Cyc. of Pract. Med. vol. ii. p. 519, 520.) illustrative of the point. "To whatever affection of the thoracic viscera hydrothorax is to be traced, the earliest symptom of effusion is an œdematous state of the eyelids, occurring chiefly in the morning. This is sometimes so little remarkable, that it escapes attention until inquiry be made by the medical attendant; and often it is only remembered when the feet and ancles have been observed to swell in the evening. The progress of the disease from this point is exceedingly variable, and this variableness seems to depend much upon the nature of the original affections. In diseases of the heart the early progress is usually slow, the breathing being manifestly more difficult than before the external œdema was perceived, but for some time not aggravated in any remarkable degree. Gradually, however, the external œdema increases, and, *pari passu*, the thoracic oppression, the difficulty of lying down, the dyspnœa, &c. become more distressing. At first, probably, little attention is paid to the difficulty of assuming the recumbent posture, the patient satisfying himself with having his head raised by more pillows. The necessity of having additional pillows continually augments, till at length perfect orthopnœa is established, and he is only able to sleep in a chair. The dyspnœa undergoes also at times very severe exacerbations, the cause of which is not very readily ascertainable . . . . . . The duration of this state varies considerably in different individuals, sometimes lasting for weeks without any alleviation of symptoms, sometimes admitting of great relief by medicine, and intervals of almost perfect ease; at other times its progress is extremely rapid, a few days only intervening between the first symptoms of effusion and dissolution. . . . . . What we have said refers to hydrothorax from disease of the heart; when it succeeds to bronchitis or pneumonia the progress is somewhat different. The palpitations and other cardiac symptoms are usually wanting, and there is nothing more manifested than increased dyspnœa. Previously to this becoming very marked, however, the face and feet swell as in the former instance; the patient then requires the head and shoulders to be raised; and at length, as in the former case, he is unable to lie down at all. In these cases the termination is seldom so sudden as when the heart is diseased, neither does the countenance exhibit in the same degree the purple and livid appearance."—*Transl.*

Considering the infrequency of true hydrothorax, it is hardly necessary to say any thing of its treatment. I would only observe that it would be wrong to consider the disease as incurable merely because it was complicated with disease of the heart. I noticed above, an example of this kind, in which the treatment was rapidly successful. Diuretics and purgatives are the chief means. I shall not repeat what I formerly stated respecting their employment in thoracic effusions, as almost every thing recommended for the cure of the chronic pleurisy is applicable to that of hydrothorax. The discharge of the fluid by an operation would seem to afford more chances of success in hydrothorax than in pleurisy, owing to the freedom of the lung in the former disease.†

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* Some of my readers, I suspect, will be more ready to believe that mediate auscultation, in these cases, gave a false indication of the state of the parts within the chest before death: but it is evidently impossible to determine the point one way or other.—*Transl.*

† Symptomatic hydrothorax is a very common affection; and is more under the controul of medicine than many less important diseases. Indeed, digitalis, particularly the infusion in large doses, is almost a specific in removing the fluid, at least for a time. Dropsy of the chest frequently accompanies organic disease of the heart; but still more frequently, perhaps, is the latter disease, when unattended by any effusion into the pleura, mistaken for the former. In cases of this kind the stethoscope is of great use in directing the treatment; as the means so successful in relieving the dropsical affection, are, at best, useless, in the lesions of the heart. Dr. Maclean's work on hydrothorax is well deserving the attention of practitioners, as illustrating the power of digitalis in this disease, although it abounds with grievous errors in pathology and diagnosis. These mistakes were perhaps pardonable at the time he wrote; in the present state of our knowledge they could hardly be committed; certainly if committed, they would be now unpardonable.

The best form of administering digitalis is that of infusion, in doses of half an ounce every eight or six hours, and continued until it has increased the flow of urine, or otherwise manifested its specific effects upon the pulse or general system. This remedy is most effective in the asthenic diathesis where there is much debility, with pallid skin and feeble pulse. The diuretic effect of digitalis in such cases, is often increased by combination with opium, and I have been usually in the habit of conjoining with it the carbonate of potass and nitrous æther as practised by Dr. Maclean. If the hydrothorax supervenes to disease of the heart, while there still exists a good deal of power in the system, venesection is almost always proper; and, in such cases, drastic purgatives, and especially elaterium, often produce most striking relief. When the elaterium is found to act beneficially, it should be repeated every two or three days, if the strength of the system supports its action. When the state of debility is great, we must either combine with our diuretics, or immediately follow them up by tonics, particularly the milder preparations of steel, as the ferrum tartarizatum or the hydriodate of iron. In the agonizing paroxysms of dyspnœa in the last stage, art is nearly powerless in ministering relief: our only hope of even temporary ease, is in large and repeated doses of opium, particularly the black drop of Battley's sedative, not regulated by times or quantities, but by their effects: with these we commonly combine æther, and probably not without reason.

In regard to the operation of paracentesis, which Laennec seems to regard somewhat favourably,—I believe the cases of hydrothorax are extremely few where it is advisable or even justifiable. The very circumstance of the effusion being generally present in both sides at the same time, is a strong objection: and the assured brevity

CHAPTER III.

OF BLOOD EFFUSED INTO THE CAVITY OF THE PLEURA.

Penetrating wounds, or even a severe contusion of the chest, may produce an effusion of blood into the cavity of the pleura. The same thing takes place in certain cases of disease, and may follow the rupture of an aortic aneurism. In some cases, also, there is no doubt that a very oopious exhalation of blood may take place spontaneously, without any solution of continuity or external violence. I do not here allude to those effusions which accompany the hæmorrhagic pleurisy, or which sometimes attend the formation of blood-vessels in the false membranes, or which confer on certain other effusions a sanguineous tint merely;—but to a primary and idiopathic effusion of blood, analogous to the hæmorrhages, active or passive, of other organs. This case is

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of the relief is a still stronger: yet when the distress is extreme, and we have good ground for believing that the chief part of this depends more on the effusion than on the organic disease, and particularly if the fluid is entirely or chiefly confined to the sac of the pleura, I do not think we ought to be deterred from affording even the equivocal relief offered by the operation. Out of 23 cases of effusion into the chest, in which the operation of paracentesis was performed under the directions of Dr. Thomas Davies, of London, 11 were simple empyema, 9 pneumothorax with effusion, and 3 hydrothorax: of the first, 8 recovered, while of the latter, all died. It is proper to state, however, that the three patients with hydrothorax (all from disease of the heart) were relieved by the operation for a considerable time. (*Cyc. of Pract. Med.* vol. ii. p. 43.)—*Transl.*

LITERATURE OF HYDROTHORAX.

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1790. Haering, (P. P.) De hydrothorace. *Lips.* 4to. Id. Abhandl. von der brustwassermcht. Neueste Samml. *Lips.* 1794. 8vo.
1795. Gutberlet, (J. C.) De signis hydropis pectoris. *Wurtzb.* 8vo.
1799. Chardel, (F.) Obs. sur l'hydropisie de poitrine, &c. *Par.* 8vo.
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1803. Lerouse, (A. H.) Recherches sur la Paracenthese dans les Hydropisies de poitrine. *Par.* 8vo.
1807. Hamilton, (W., *M. D.*) Obs. on Digitalis in Dropsy of the Chest, &c. *Lond.* 8vo.
1810. Maclean, (L., *M.D.*) An Enquiry into the nature, &c. of Hydrothorax. *Sudbury.* 8vo.
1815. Romerus, (F.) Observatio exper. confirmata pro hydrope pectoris, &c. *Par.* 8vo.
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1833. Bouilland. Dict. de Méd. et de Chir. (Art. *Hydrothorax.*) *Par.*
1835. Darwall. Cyc. of Pract. Med. (Art. *Hydrothorax*), vol. ii. *Lond.*
1834. Copland. Dict. of Pract. Med. (Art. *Dropsy of the Chest*). *Lond.*
Morgagni, Stoll, De Haen, Cullen, Burserius, Frank, Good.

doubtless very rare; yet some examples can bear no other explanation. These various cases constitute what has been improperly called sanguineous empyema. The most common of these is, unquestionably, that which occurs in the hæmorrhagic pleurisy; and almost all those which I have seen become the subject of operation have been of this kind. The extravasations of blood produced by a violent contusion are in general easily dispersed; and those which are the consequence of a wound, are discharged by the wound itself. The most dangerous species is the spontaneous, inasmuch as, being usually the effect of a general hæmorrhagic diathesis, the removal of it, however affected, will, in all probability, be followed by a similar effusion in some other place. Blood effused into the cavity of the pleura may be absorbed as readily as when thrown into the cellular substance in consequence of a blow; and we know that enormous extravasations of this sort are frequently re-absorbed in a few weeks, or even in a few days. When absorption does not take place quickly, the blood is sometimes decomposed, and an aeriform fluid is disengaged, producing particular symptoms, as we shall see more particularly in the chapter on pneumothorax.

The effusion of blood into the pleura affords the same results from percussion and mediate auscultation as other liquid extravasations into the same cavity. I shall not, therefore, repeat what was formerly stated on this subject. In the case where the effused blood should be entirely or almost entirely coagulated, I presume that ægophony would not exist; since the transmission of the voice through a fluid appears one of the most essential conditions for the production of this phenomenon.

Treatment.—I shall not repeat here what was formerly said of the hæmorrhagic pleurisy. The effusion of blood produced by a severe contusion of the chest, or the fracture of a rib, requires, in general, the employment of blood-letting in the first instance, to relieve the dyspnœa and moderate the succeeding inflammation. Diuretics and slight purgatives, given from time to time, are then the best measures for promoting the absorption of the blood. In the effusions occasioned by a penetrating wound involving the vessels of the lungs, the most rational indication is to confine the blood within the chest, so as to make it compress the lung and thereby check the hæmorrhage if possible: the absorption of the blood afterwards, will not be more difficult than in the preceding instance. The spontaneous effusion is unquestionably the least under the controul of art, being always the consequence of a hæmorrhagic diathesis, which is got the better of with much difficulty. This case is, however, extremely rare: and, moreover, almost all that was formerly stated respecting the hæmorrhagic pleurisy is applicable to it.

CHAPTER IV.

OF PNEUMOTHORAX, OR THE ACCUMULATION OF AIR IN THE CAVITY OF THE CHEST.

SECT. I.—*Anatomical Characters and Varieties of Pneumothorax.*

OCCASIONALLY we find aeriform fluids in the cavity of the pleura. These are sometimes without smell, more commonly fetid, and of a fœtor resembling that of sulphuretted hydrogen gas. These fluids are sometimes in such quantity as very forcibly to compress the lung, and to distend the thoracic parietes in a very sensible manner. In this case the ribs are found more or less separated,—and the diaphragm projects into the cavity of the abdomen: when the disease exists on the left side of the chest, the muscle is found considerably prominent downward; and when it is in the right side the liver is thrust below the margin of the ribs. Although this affection cannot be said to be of excessive rarity, it has hitherto been but little noticed by medical men. All that we find respecting it in practical writers, are a few examples very imperfectly described; and, in general, we know it merely from the casual observations of anatomists and surgeons, who have occasionally noticed the escape of air in opening the chest after death, or in performing the operation of empyema.* There exists no special memoir on this subject, to the best of my knowledge, but an inaugural dissertation of twenty pages, by M. Itard, at present physician to the institution for the deaf and dumb.† The disease is named by M. Itard, Pneumothorax. He details five cases of it, three of which are original, one extracted from Selle, and the fifth furnished by M. Bayle. In these the aerial effusion co-existed with phthisis and chronic pleurisy; and in all of them the lungs of the affected side were compressed into a small compass towards their roots. The fluid was more or less fetid. The cavity of the pleura was invested by a false puriform membrane, at least in the instances noticed with any degree of detail, and contained a few spoonsful of pus. The author of this memoir, in conformity with the then established notions, considers the pneumothorax as an affection always consequent to and depending on a latent phthisis; and that its exciting cause is "the decay of the lungs by means of a chronic suppuration, together with the partial absorption and decomposition of the pus owing to its long stagnation in a confined cavity." We have already seen that this *consumption* of the lung (*pulmones assumpti* of Lieutaud,) is not owing to the destruction of that viscus by suppuration, but that the collection of purulent matter is the cause and not the effect of the diminished size of the lungs. This fact, which I believe M. Corvisart was the first to demonstrate in his clinical lectures, is now considered as unquestionable by every one well acquainted with morbid anatomy. In former pages we have ourselves shown that the lungs may be reduced to a very small volume by purulent or watery effusions, without containing tubercles, or showing any mark of suppuration. All the cases of M. Itard, then, are to be considered as pneumothorax consequent to a latent *pleurisy*, which co-existed with the phthisis, and in which the greater part of the effused liquid had been absorbed.

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* Vide *Riolan*, Enchirid. Anat. lib. iii. cap. ii.—*Pouteau*, Œuv. Post. t. iii.

† Dissertat. sur le Pneumothorax, &c. *Paris*, 1803.

It is sufficiently probable that, in these cases, the gas was the product of the decomposition of some portion of the effused albuminous and puriform matter: the character of its smell leads to this opinion. This species of pneumothorax is pretty frequent.[*] There are several other varieties sufficiently distinct. I have several times discovered this affection co-existing with a considerable sero-purulent effusion of the pleura, and a communication between this cavity and the bronchi, owing to the rupture of a vomica, or softened tubercle, simultaneously into the bronchi and pleura. I consider this species as the commonest of all; at least, I have met with it most frequently.[†] In this case it is reasonable to believe the air contained in the cavity of the pleura to be simply the atmospheric air conveyed thither by the bronchi. I shall subjoin several remarkable instances of this variety. It is possible that, in this case, the introduction of the air into the pleura may excite inflammation of that membrane, and that, consequently, the pleurisy may be the effect of its presence and not the cause, as in the instances given by M. Itard. It is, however, also possible, that a vomica may burst into this cavity without at the same time communicating with the bronchi, and may thus excite a pleurisy, and consequent pneumothorax through the decomposition of the pleuritic fluids. This case comes under the same head as those of Itard, with this difference that the original effusion is here considerable. Pneumothorax may also be conjoined with hydrothorax; and indeed the phenomena of certain cases that have occurred demonstrate its existence. It is, no doubt, probable that most of the supposed cases of this kind have been truly pleuritic effusions, mistaken for the simple serous exhalation; but M. Bayle gives one incontestable instance of this sort, in a person where there was found a small portion of serum and a great quantity of air in the pleura.* I have myself frequently observed a certain quantity of air, together with the serum, in the symptomatic hydrothorax, supervening just before death.

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[*] The subsequent more extended experience of pathologists render this opinion of Itard and Laennec respecting the source of the air in these and other similar cases, more than problematical. Indeed there can, I think, be little doubt that the air in M. Itard's cases originated in a fistulous communication with the bronchi, although this was not detected on examination. I am even disposed to doubt, with Dr. Houghton and other modern pathologists, if pneumothorax is ever produced by the decomposition of a pleuritic effusion. "It may be laid down as proved (says Dr. Houghton) that where pneumothorax exists, the air has been introduced from without; for cases of an opposite description are so rare that they must be considered as exceptions to the rule."—(*Cyc. of Pract. Med.* vol. iii. p. 452).—*Transl.*

[†] "This species of the affection," [that is, pneumothorax from the bursting of a tubercular absess into the pleura,] says Dr. Houghton, "is, beyond all comparison, more frequent than all others. If we were to conclude from the experience of the medical men of Dublin who have given most attention to the subject, it might be asserted that it constitutes fully nine-tenths of the cases of pneumothorax, with the exception of the trumatic variety; and this, or even a greater proportion, is established by the cases found in medical writings since the publication of Laennec's work, ... The rupture may occur in any of the lobes of the lung; but the inferior part of the upper lobe, and the superior part of that beneath it, is the place where it has been most usually observed. In a great majority of cases it has been found to happen on a line with the third rib, posteriorly about the costal angle and just under the reflection of the false membrane by which the superior lobe is so generally adherent. But it may happen at any part of the pulmonary substance." (*Cyc. of Pract. Med.* vol. iii. p. 451. sq.)—*Transl.*

Pneumothorax also occurs almost always when a gangrenous eschar of the lungs is softened and evacuated into the cavity of the pleura. In this case gas is evolved during the chemical decomposition of such matter; and this, together with the fluid effused by the irritated pleura, compresses the lung, and dilates the affected side. We have already given two examples (Case XV. and XVII.) of this species of pneumothorax. Gangrene of the pleura, also, commonly produces the same effect. A case of this kind will be subjoined. The same results follow the decomposition of blood effused into this cavity. On examining the body of a man that died after an illness of five days, Littre found in the chest two pints of blood, and an enormous quantity of air. This affection may, further, be produced by rupture of the pleura of the lungs from external violence. A case of this kind is mentioned by Hewson.†

It is likewise probable that in the case of emphysema of the lungs, with rupture of some of the air-cells and extravasation of air under the pleura, this membrane may sometimes be ruptured and the disease in question be thus formed. I saw a case of this kind a short time since. It seems further probable that in the case of emphysema of the lungs with rupture of the air-cells and extravasation of the air under the pleura, this membrane may itself be ruptured and thereby give rise to pneumothorax. I think I have met with such a case; but as the note I made of it is lost, I will not venture to assert the thing as positive. Even in the acute pleurisy in its commencement, and without any

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[*] Recherches sur la Phthisie, p. 176, Obs. xi.

[†] Med. Obs. and Inq. vol. iii.

chemical decomposition of the effused fluid, there may co-exist a gaseous effusion; and I shall detail a remarkable example of this at the end of the present section. Finally, an aeriform fluid may be formed in the cavity of the chest, without there being any solution of continuity, any other effusion, or any perceptible change of structure whatever. I have often perceived the escape of an inodorous gas, in opening the thorax, where there was no perceptible affection of the pleura. Sometimes, indeed, this membrane appeared to be drier than natural; and I remember one case in which it was, in some places, almost as dry as parchment. Even in these cases a rupture of the pleura, so slight as to be unperceived, may be imagined; but, independently of the circumstance that such rupture cannot well be supposed without some external violence, we know that an idiopathic formation or secretion of air can and does take place in the animal system. It is thus that we sometimes find air, in considerable quantity, in the pericardium, in the synovial capsules, and under the arachnoid in cases where there exists no other effusion within these membranes; we find the same, also, though more rarely, in the cavity of the peritoneum. It would even appear that air, or an aeriform fluid, exists naturally, in small quantity, in the cavity of the pleura. At least, M. Ribes assures me that he has found, in opening the serous cavities of dogs, a small quantity of air constantly to escape. This may probably, however, be merely the natural serous exhalation in a state of vapour.[*]

Whatever be the nature of the gas contained in the cavity of the pleura, in simple pneumothorax, we can conceive that it may long remain there, without giving rise to any inflammatory affection of the pleura, as would no doubt be the effect of atmospheric air introduced by means of a tuberculous excavation communicating simultaneously with the bronchi and pleura.[†] In fact, air secreted by the vessels of the pleura, must be in some sort animalized, and, therefore, much less likely to irritate, than a body so thoroughly extraneous to the animal system, as the air of the atmosphere. That air introduced into the pleura in the manner just indicated, is not always productive of a fatal or even severe pleurisy, is proved by the following case, which, moreover, affords a good example of a disease but little known and imperfectly described.

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[*] There is still another mode in which pneumothorax originates, viz. from the perforation of the pleura and bronchi, from without inwards, that is, by the matter of an empyema. A case by Dr. Archer (Trans. Dub. Assoc. vol. ii.), and another by Dr. Hawthorne (Ed. Journ. vol. xv.) appear to be of this kind. It often happens, however, that the matter of empyema perforates the lung and is discharged by the bronchi without the supervention of pneumothorax.—*Transl.*

[†] The air contained in the sac of the pleura in pneumothorax has been chemically examined by Dr. Davy and Apjohn (Phil. Trans. 1824.—Dub. Trans. of Coll. Phys. vol. v.) and has been found to be atmospheric air slightly modified. By Dr. Apjohn's analysis the 100 parts consisted of carbonic acid, 8; oxygen, 10; nitrogen, 82. In Dr. Davy's cases the gas consisted of 7 or 8 parts of carbonic acid, and 92 or 93 of oxygen. In one of Louis's cases (*Sur la Phthisie*, obs. x. 41) the gas is said to have been carbonic acid, but no positive analysis is stated to have been made.—*Transl.*

CASE XXXV.—*Simple pneumothorax, conjoined with latent phthisis.*—A man, aged sixty-five, of a strong constitution, subject for two years to a cough which did not prevent him from following his business, was attacked on the 15th October, 1816, with violent pains in the abdomen, and died the same night, in the Necker Hospital.

After death, the body, though emaciated, still retained considerable muscularity. The right side of the chest was evidently larger than the left, and yielded a louder sound on percussion than even the chest of a healthy person usually does. The left side yielded a sound comparatively obscure through its whole extent. There were found some diseased appearances in the brain. On penetrating by the scalpel the right cavity of the chest, an inodorous gas escaped, and in large quantity, to judge by the force and duration of the sound occasioned by its exit. The lung on this side was somewhat compressed towards its roots, but still retained three-fourths of its natural dimensions. The side of the chest was considerably dilated, and, besides the lung, might have contained about two pints of liquid,—the quantity, no doubt, of gas that had made its escape. The whole of the pleura was drier than usual, and rather slightly unctuous than humid; there were no false membranes nor any effused fluid. The lung adhered to the costal pleura at its upper lobe, by means of cellular layers an inch in length, which seemed of no very ancient date. This adhesion was attached at one end to a species of cartilaginous incrustation of the size of the palm of the hand, which adhered closely to the pleura pulmonalis. In detaching the cellular adhesions from this fibro-cartilaginous body, there remained in the centre of the latter, a small oval opening, about a line and a half in diameter, which communicated with an excavation in the lung, which could have contained an orange. I am not quite certain whether the oval opening, above mentioned, existed before, or was formed by the act of detaching the lung from its adhesions; though I am inclined to consider it as previously existing. The excavation was nearly empty, containing only about a spoonful of pus. Its parietes were immediately formed by the pulmonary tissue, except in that space answering to the cartilaginous incrustation, where, to the extent of more than an inch square, they consisted solely of this false membrane. There were many tubercles, in different stages, and also numerous hard melanose tumours in different parts of the lung. The left lung adhered to the costal pleura in its whole extent. It also contained tubercles and melanose tumours. There was, likewise, a tuberculous cavity, of considerable size, in the upper lobe, and there was disease in the large intestines.

In the above case the aeriform effusion into the right side of the pleura, may with equal probability be attributed either to the rupture of the tuberculous excavation existing in the upper part of the lung into the bronchi and pleura at the same time, or to the simple exhalation of air into the pleura. The former supposition is supported by the fact of the existence of the opening (if indeed such did exist) at the summit of the lung and by the state of the false membranes, particularly their thickness at the base: the latter is rendered more probable by the co-existence of air in the pericardium, a circumstance which would seem to indicate a general disposition of the serous membranes to secrete air; and this probability is heightened by the doubt which exists as to whether there really was any opening into the pleura.

Sect. II.—*Of the Symptoms and Signs of Pneumothorax.*

The symptoms of pneumothorax are very obscure, inasmuch as they may belong to many other affections. The only one which is pretty constant is a certain degree of dyspnœa: cough does not seem necessarily to accompany it. Percussion by itself does not supply any certain result. When the accumulation of air is very considerable, the affected side yields a clearer sound than the other; but this difference, even when very distinct, so far from pointing out the existing disease, rather leads us into a two-fold error, by making us consider the side which yields the dullest sound as diseased, and that which really is so, as sound. It moreover frequently happens, that when the pneumothorax is complicated with a liqud effusion, both sides sound equally well, or even that the affected side sounds less than the other, according to the quantity of the effused air. The comparative size of the two sides is not more satisfactory. Not only is the affected side not always larger, but it sometimes becomes even smaller than the other, from the absorption of a part of the air and liquid contained in it. Even in the cases where the dilatation of the side is obvious, it does not furnish any surer indication than percussion. From its superior size and resonance, one will be apt to consider the diseased side as sound and the healthy one as contracted, in the manner formerly described. Mistakes of this kind we may consider as quite inevitable; or if, by chance, the dilatation and tympanitic resonance point out the disease, (as was done by Bayle in a case formerly related,) it will more frequently happen that these signs shall deceive rather than assist us. This will be more fully shown in the ensuing section. I shall content myself at present, with remarking, that during the period of my attendance on the clinical lectures of Corvisart, I saw many cases of pneumothorax in the dead body, none of which had been suspected during the life-time of the patient. No one will refuse to this celebrated teacher either the talent for observation, or the ability to make the most of percussion: consequently the best proof that can be afforded of the insufficiency of this method to detect pneumothorax, is the fact of his being mistaken in these cases.

The certain diagnosis of pneumothorax is afforded by the comparison of the results of percussion and mediate auscultation. Whenever we find one side of the chest sounding more distinctly than the other, and, at the same time, perceive the respiration very well in the least sonorous side and not at all on the other,—we may be assured that there exists pneumothorax on the latter. We may be equally sure of our diagnosis when both sides are alike sonorous, and even although the affected side were somewhat less sonorous than the sound one. This latter case occurs when the pneumothorax supervenes to pleuritic effusion, or any other fluid extravasation. Here, before the supervention of the pneumothorax, the affected side yields a perfectly dull sound, and the respiration is either entirely absent, or is heard very indistinctly. As soon as the gas begins to accumulate, the resonance of the chest returns, in some degree, in the situation occupied by the air, without, however, being as distinct as in the sound side. Day by day, the extent and intensity of this resonance increase, without any return of the sound of respiration: and if there had previously been any remains of the respiratory murmur, even this now totally vanishes. There is only one circumstance which can render the diagnosis more difficult in such cases: this is the case of the lung being attached to the side by means of a very short cellular tissue: in the point of adhesion the respiration will be still audible; and an inattentive observer, who might have applied the instrument on this place only, might still mistake this disease. It is hardly necessary to observe, that, in pneumothorax, as in pleurisy and hydrothorax, some degree of respiration will be still perceptible in that part of the back corresponding to the roots of the lungs. Air being a worse conductor of sound than liquids, it is more difficult to perceive the respiratory sound of the healthy side on that which is diseased, in pneumothorax than in empyema. M. Cayol, however, lately pointed out to me a case of this kind; but it is proper to state that there was here a liquid as well as a gaseous effusion. I formerly pointed out the means of avoiding the mistake in question.

The only other disease which presents analogous signs, is emphysema of the lungs, the consequence of an extensive dry catarrh; but the differences between these diseases is so striking, that they could only be mistaken by a very inattentive observer. These differences are chiefly in the following: in the case of pneumothorax, the respiratory sound is completely lost, even in the most energetic inspirations, over every part of the chest, except between the scapula and spine, where it is still audible, although weaker than in the natural state. In the case of emphysema, there is never the total loss of the respiratory sound generally, nor its comparative integrity at the root of the lungs; in it, even in the most severe cases, the respiration is still audible, though very feeble, in some variable points. The slight rhonchus which accompanies the dry catarrh, and still less the dry crepitous rhonchus which is its pathognomonic sign, are never present in the pneumothorax. The effusion of air comes on suddenly, and cannot exist for any length of time without giving rise to severe symptoms and even producing death. I have never seen pneumothorax in any person who was not confined to bed; while emphysema comes on gradually, and does not always incapacitate the patient for exertion, even when existing in the most intense degree in both lungs. The signs just mentioned are the same in every variety of pneumothorax; but when there exists a collection of liquid as well as air, we have the want of both respiration and resonance over the part occupied by the former, and the want of respiration only over the part occupied by the latter. This complication, as well as the fistulous communication between the pleura and bronchi, is moreover recognized by the Hippocratic succussion; and the last-mentioned case will, further, be instantly pointed out by the metallic tinkling or the *amphoric buzzing*. The importance of these two signs induces me to appropriate a separate article to each; but I shall previously give an example of pneumothorax recognized during the patient's life-time.* A similar case was indeed formerly detailed (Case XVII.) and several others will be given at the end of this section. The case which I am now to relate is remarkable, inasmuch as the effusion of air was detected at its very formation, and its progressive increase followed from day to day. I could have added other cases of simple pneumothorax supervening to other diseases three or four days before death and instantly recognized; but as they were not in other respects of an interesting kind, I shall not here detail them.

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* Among the rational symptoms supposed to indicate pneumothorax, besides those mentioned in the text, the following have been particularly dwelt on by different writers: decubitus, or the posture assumed by the patient in bed; displacement of the heart; depression of the liver. In respect to decubitus, I believe we may assert that although different patients prefer different sides, yet that the majority prefer lying on the affected side. When the effusion is on the left side there is often great displacement of the heart to the right side, as in the case of simple empyema; and when it is on the right side, there is frequently a very marked depression of the diaphragm and liver. An observation recently made by Dr. Stokes, in a valuable paper on the diagnosis of empyema, (*Dub. Journ.* vol. iii. p. 50,) deserves notice in this place, as it is equally applicable to pneumothorax as to empyema,—if indeed, these two diseases were not almost always conjoined. The observation refers to the discrimination of a tumid hypochondre produced by an *enlarged* liver, from one produced by a sound liver, *depressed* from thoracic effusion. "If it be the first," says Dr. Stokes, "we find the tumour presenting a continuous surface and feeling of resistance from its most prominent position to where it can no longer be traced under the ribs, the lower margin of which seems tilted out. But if it be a displaced liver, we find, between its most convex portion and the edge of the false ribs, a sulcus, evident to the sight and to manual examination, presenting much less resistance, and evidently the result of the space left around the point of contact of two convex bodies, one the upper portion of the liver, the other the most prominent point of the depressed diaphragm."—*Transl.*

CASE XXXVI.—*Pleurisy followed by pneumothorax.*—M C——, a physician, of the Faculty of Paris, aged thirty-six, was attacked in May, 1822, with fever, diarrhœa and cholic, complaints to which he had been subject. He had twice applied leeches to the abdomen before I saw him on the 27th. I ordered them to be repeated, with the effect of relieving his pains, but not the fever. Finding that this fever was of a remitting nature, I prescribed bark in large doses, combined with tartar emetic, which cut short the periodical accessions, and left a very slight degree of fever. On the 8th day of this false convalescence, upon paying a visit to the patient, (who considered himself as almost cured,) I thought I observed the respiration to be quicker than usual. In consequence, I applied the stethoscope, and discovered all the signs of an acute pleurisy of the right side, viz. complete absence of respiration and resonance, and ægophony, (slight as to degree, but of a very sharp and *bleating* character,) over the whole of the side and even on the upper parts. I had never met with so extended ægophony, and I could only account for it, by considering the lung as attached to the costal pleura by ancient adhesions in different points, so as to prevent the viscus from being separated from the walls of the chest to any great distance. This pleurisy was completely latent, as there was neither stitch nor oppression, and no more cough than that slight dry cough which attends almost all continued and even intermittent fevers. I applied twelve leeches to the side. On the following days the ægophony became less, and gradually disappeared over the upper half of the chest; the part where it began to be heard becoming every day lower. Percussion now yielded the natural sound over the space left by the ægophony, but there was no respiratory sound whatever, although this was perceived in a very slight degree over the lower two-thirds, where the ægophony was still strongly marked, and the sound on percussion entirely dead. It was evident from these signs that pneumothorax had supervened to the pleuritic effusion. I did not attempt to confirm my diagnosis by means of succussion, for fear of alarming the patient. As the side was not at all dilated, and there was no metallic tinkling, I concluded that pneumothorax was not the consequence of a pulmonary fistula, but of simple exhalation into the pleura; and that the sero-purulent fluid was absorbed in proportion as the gas accumulated. This last circumstance was moreover quite evident from the fact, that the ægophony and dead sound were found to retreat daily before the pneumothorax. Fifteen days from the appearance of the pleurisy, and thirty from the attack of fever, ægophony and the sound of respiration were confined to the middle of the back

The anterior-superior half of the left side yielded on percussion a decidedly clearer sound than the other side; and on the lower parts the sound of respiration was entirely wanting. From this time the patient gradually sunk, with various symptoms, connected as well with the fever as the pneumothorax, and died on the 17th July.

Dissection thirty hours after death—Upon penetrating the left side of the chest a large quantity of inodorous gas made its escape with a hissing sound; and upon laying open the chest, the lung was found compressed towards the mediastinum, (no doubt by the air that had escaped,) leaving a space between it and the costal pleura capable of containing more than a pint of liquid. The lung was attached to the pleura of the ribs by five or six points, two at its anterior border and the other at its outer and posterior surface, in such manner that it could not be completely compressed against the mediastinum, and was not indeed, in any point, more than two inches distant from the walls of the chest. The lower and back parts of this side contained about ten ounces of a bloody serosity, and a large quantity of false membranes, of a yellow colour, pretty thick, and of a tolerably firm consistence. The remaining part of the pleura pulmonalis was healthy: and the costal pleura on its upper and lateral parts was of a dead white colour and of a shining appearance like that of cartilage; here and there on its surface there were some tuberosities of the size and shape of hemp-seed, and whose texture, as well as that of the pleura itself, seemed intermediate between that of the healthy pleura and fibro-cartilage. This portion of the pleura was at least a quarter of a line thick. Upon dissecting it, some tuberculous masses, yellow and opaque and of the size of a lentil or hemp-seed, but for the most part flattened, were found on its exterior or adherent surface, so as to give rise to elevations on its inner surface, less regular in appearance than the small tuberosities already described. The lung was compressed so as to be not larger than twice the thickness of the hand. It was of a violet hue, soft and flabby, but otherwise healthy, and did not contain a single tubercle. The right lung was universally adherent by means of old cellular attachments; and its upper lobe contained many tubercles in every stage of their progress.

SECT. III.—*Of Pneumothorax with liquid effusion, and of its exploration by Succussion of the Chest.*

When I first began to make use of the stethoscope, I was in hopes that this instrument might furnish some sign, analogous to the rhonchus, calculated to discover collections of serum or pus within the chest, by means of fluctuation. Two methods of effecting this exploration naturally presented themselves: one was to percuss the chest on one side, as in ascites, and apply the stethoscope to the opposite one; the other was to listen simply to the sounds occasioned by the agitation of the fluid from the natural action of the heart and lungs. A little reflection might have convinced me of the unlikelihood of my expectations; yet this conviction did not arise till after many vain attempts to obtain the object I had in view. I ascertained that the instrument readily communicated the shock in the cases of ascites; but I never could obtain a similar result in the case of thoracic effusions: and the reason of this is obvious. On account of the solid and bony character of the walls of the chest, the percussion used to produce the fluctuation, conveys more impulse and sound to the ear of the observer, than does the shock produced by the liquid, and consequently completely masks the latter. This result is a necessary consequence of the known principle that solids communicate impulse and sound better than fluids. In the case of ascites, the shock communicated to one side of the abdomen, is not transmitted by the abdominal parietes on account of their softness; and in aeriform collections in this cavity, the impulse is not conveyed by the air, on account of its being a worse conductor than fluid.

Simple auscultation would seem, from reasoning, to be more capable of supplying some signs of the effusion of fluids into the pleura; but from causes to be hereafter detailed, it will appear evident, that this could only be the case when there existed at the same time a liquid and aeriform effusion, and when fluctuation was excited by means of a severe cough. The thing, however, does not seem altogether impossible; although I am doubtful if it ever yet was observed. I have already stated that we can sometimes distinctly hear fluctuation in tuberculous excavations of considerable size, when they are only half filled with a very liquid matter; and this is easily explained by the relative condition of the parts concerned in the production of this phenomenon. In this case the quantity of fluid to be moved is small, the communication with the bronchi is usually narrow, and the soft walls of the excavation are strongly impressed both by the mediate and immediate compressions produced by the cough. Air effused into the pleura, on the contrary, almost always communicates with the air in the larger bronchi, by means of a short and wide channel; and being confined between the bony walls of the chest and the lung bound down against the spinal column, it is very little susceptible of compression, much less of agitation, by the action of coughing. The fistulous opening is, moreover, rarely situated below the level of the fluid. For these reasons, then, I am of opinion, that the cough will hardly, in any case, occasion an audible fluctuation of a liquid contained in the pleura; and we may be assured that, whenever such fluctuation is heard, the cause of it is situated in an ulcerous excavation We can have still less expectation of hearing any sounds of this kind by simple auscultation, independently of coughing. I have repeatedly endeavoured to do this, in cases wherein the co existence of air and liquid was proved by other means, and always unsuccessfully. In cases of simple hydrothorax or empyema without any accompanying extravasation of air, the impossibility of doing this, is still more clearly demonstrated.

I ought to be the less surprised at these unsuccessful results of my attempts, as Hippocrates himself, as I have elsewhere shown, committed the same mistake. But if auscultation by itself cannot, as Hippocrates supposed, detect the presence of a fluid in the chest, we obtain at least from the writings of this great man, or those of his disciples, a sign very characteristic of this affection, in one particular form of it. This method of exploration, which perhaps has never been practised but by the Asclepiades, consists in shaking the patient's trunk, and at the same time listening to the sounds thereby produced. This process is described by the author of the treatise *De Morbis* (lib. ii. 45) in the following terms: "Having placed the patient in a firm seat, cause his hands to be held by an assistant, and then shake him by the shoulder, in order to hear on which side the disease shall produce a sound." Although this method is described in a work which is not unanimously attributed to Hippocrates, we cannot doubt of its having been known to him, and of its having been a common practice among his followers: many passages in the Hippocratic writings either speak of it formally, or by implication. On this point, as on several others, the Asclepiades have generalized too much on the facts observed by them: every where they mention this method as a sure means of recognizing empyema; and yet there cannot be a doubt, as will be shown hereafter, that the simple empyema was never so detected. It is, no doubt, owing to the fruitless attempts made in different times to discover the simple disease in this manner, to which we are to attribute the entire abandonment of the method in question. So complete, indeed, has been this abandonment, that in reading the Commentators of Hippocrates we do not find a single indication of the plan having been ever put in practice by any of them; and we even find that the cleverest of them do not seem to have always well understood the passages in which it is mentioned. Succeeding practitioners appear to have paid as little attention to it; although most of the systematic writers on surgery mention it, but doubtfully, and, as it would seem, merely out of respect to Hippocrates. I know of no author who states his having himself practised it; but a few observers mention cases in which the spontaneous movements of the chest, produced a sound of fluctuation perceptible by the patient, and sometimes by the attendants. Morgagni was witness of a fact of this kind,* and has recorded four others observed by Fanton,† Mauchart,‡ Wolff,§ and Willis.‖ To these we ought to add another noticed by Paré¶ but omitted by Morgagni, and perhaps some more that have escaped my research as well as his. At all events, cases of this kind have hitherto been considered as extremely rare. None of the observers just mentioned, seem to have thought of ascertaining, even in the cases described by themselves, whether succussion would produce the sound, as well as the spontaneous movements of the patient; and some of them, particularly Morgagni and Fanton, have even endeavoured to show that the method of Hippocrates can be productive of no result.

This opinion is, no doubt, quite correct, in relation to the class of cases considered by them, viz. collections of fluids simply, without any accompanying air. The sound of fluctuation cannot, in fact, be ever perceived in simple empyema or hydrothorax, even under the most powerful succussion, as I have many times proved. When, however, pneumothorax is conjoined with either of these affections, the phenomenon is distinctly perceptible. Sometimes, also, the spontaneous movements of the patient in bed, or while walking, produce a fluctuation sufficiently loud to be heard by himself or the bystanders. In some of the cases which I shall relate, this phenomenon was present; but the only practitioner whom I have met with, that has noticed a similar fact, is M. Boyer: he informs me that he saw a young man, in consultation with MM. Hallé and Jeanroi, who very distinctly perceived the sound of fluctuation within the chest, when coming down stairs. When the sound cannot be perceived by the naked ear, on account of its feebleness, the stethoscope enables us to do so very distinctly, as will be seen in two of the cases at the end of this chapter. Such a circumstance will particularly occur at the commencement of the effusion of air, and while this is still in small quantity. As soon as the accumulation becomes considerable, the sound is heard very distinctly by the unassisted ear. In some cases I have even observed, that the motion of the fluid could be perceived by the hand during the alternate stooping and raising of the chest.

The Hippocratic fluctuation is among the few signs which of themselves convey to the least experienced observer, a full and entire conviction of the existence of the disease. Nevertheless there are still some cases in which it must not be received with unlimited confidence. I have already observed, that the same phenomenon may take place in the case of a very large tuberculous excavation half full of liquid. Such a case, however, is very rare, and it has never occurred to me but once. In the instance, the lower two-thirds of the right lung were occupied by a vast excavation, in such manner that the lung formed merely the walls of the cyst, being everywhere adherent to the walls of the chest and reduced to the thickness of only one or two lines: in one point, about the size of the palm of the hand, the pleura itself appeared to form the immediate boundary of the excavation. I must admit that such a case as this cannot be distinguished from pneumothorax with liquid effusion and bronchial fistula, unless one had had an opportunity of watching it from the beginning. There is likewise another circumstance which might mislead an inexperienced observer: some persons whose stomachs constantly contain air, after having drunk a certain quantity of fluid, exhibit the phenomena of fluctuation, upon the trunk being shaken. One of my pupils possessed this power in an eminent degree, and sometimes used to amuse his comrades with the exhibition of it. This error, however, is very easily avoided; as the alternate application of the stethoscope to the chest and epigastrium readily points out the source of the sound. Besides, in this case always, and in the greater number of instances in which fluctuation is afforded by a tuberculous excavation, the absence of the other signs supplied by percussion and auscultation, will prevent us from committing the mistake in question.

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* De Sed. et Caus. Morb. Ep. xvi. art. xxxvi.

† Anat. obs. xxiii.

‡ Ephem. Nat. Cur. Cent. vii. obs. c.

§ J. P. Wolffii. Ibid. tom. v. obs. [illegible]

‖ Sepulchret. lib. ii. Schol. ad obs. lxxv.

¶ Œuvr. d'Ambroise Paré, liv. viii. chap. x.

Although Hippocrates was unacquainted with pneumothorax, in one of the passages where he speaks of succussion, we find some remarks, which if they had been often repeated, would have necessarily led to the knowledge of this disease and of its co-existence with empyema in every case in which succussion of the chest produces the sound of fluctuation. The passage is the following: "Among the patients affected with empyema, those who produce most sound, when shaken by the shoulder, have less pus in the chest than those who yield less sound, and who are more flushed and breathless: in respect of those who do not yield any sound, but who have the nails livid and a great dyspnœa, they are full of pus, and their case is desperate." (*Præn. Coac.* ii. 432.) And at the end of the passage in which the succussion of the chest is described, the author adds that "sometimes (*ἐνιοτε*) the thickness and quantity of the pus prevent us from hearing the fluctuation." (De Morb. ii. 45.) These passages ought to convince us that the Asclepiades had an idea that there must be some vacuity in the chest before a fluid contained in it can produce any sound; in the same manner as wine contained in a bottle when shaken, yields the more sound the more empty it is. Indeed one of the commentators makes use of this very comparison; but the notions entertained by them on this subject were confused and imperfect: they imagined a vacuum in some part of the chest, which we know cannot exist. Even Morgagni had hardly more correct ideas on this subject; for after having stated that the fluctuation cannot be perceived when either the fluid is in very great or very small quantity, he adds—"at saltem, inquies, eo temporis spatio, quo ab exiguâ copiâ aqua crescit, nec ad summum tamen adhuc pervenit, ejus fluctuatio videtur percipi debere. Videtur utique. Sed quidam certe non percipiunt,—alii non attendunt: alii denique non indicant medicis—Humeros vero apprehendere, et concutere aut aliter agitare non omnes ægros sane licet." (Epist. xvi. 37.) We further gather from this passage that Morgagni, without absolutely denying the possibility of fluctuation in these cases, considered the sign as almost useless, on account of its great infrequency; while, on the other hand, he considered succussion as attended with such inconveniences as ought to cause its rejection in most cases. This opinion, however, is totally unfounded. When properly used, succussion is not more fatiguing to the patient than the percussion of the chest, or the examination of the abdomen by compressing its contents. To enable us to hear the sound, it is not necessary to shake the body much: all that is required being merely to shake the shoulder pretty quickly, and to stop all at once. I have employed this mode of exploration in the case of a great number of patients, several of whom were in a state of great suffering and debility; and yet I never heard any complaints of it. There are no grounds, therefore, for leaving it in the oblivion into which it has fallen. The cases in which it supplies us with certain signs are much more common than might be supposed from the small number of examples on record. Sufficient proof of this is supplied by the five following cases, which occurred in the course of a single year in an hospital containing one hundred beds. Three other cases of the same sort, one of which I have already noticed (Case XVII.) were observed during the same period. Since the publication of the first edition of this work, I have seen at least thirty similar cases, and I have had occasion to know of many others in the hospitals of Paris. There are certainly many much rarer diseases, which are better understood.

Case XXXVII.—*Pleurisy and Pneumothorax, with fistulous communication between the pleura and bronchi.* A man aged thirty, was attacked for the first time, in May 1817, with a catarrhal affection, attended by cough, dyspnœa, &c. which continued, with variable severity, until the beginning of November, when he came under my care in the Necker Hospital. At this time there were considerable emaciation, hot skin, small and frequent pulse, short and quick respiration, much cough, and considerable expectoration of opaque, yellow, and rather viscid sputa. On percussion, the chest afforded an imperfect sound at the upper and fore parts of the right side, only a middling sound between the scapula, particularly on the right side, and a good sound every where else. The stethoscope detected the respiratory sound over the whole chest, only it was somewhat feebler than natural below the clavicles, particularly the right. Pectoriloquy existed, though rather doubtful, below the right clavicle and in the axilla. The action of the heart was natural. Diagnosis: *Tuberculous phthisis.* On the 12th, pectoriloquy was distinct under the right clavicle and in the axilla of the same side; and the respiration was more perceptible over the whole of the left, than on the right side. I therefore added to my diagnosis:—*tuberculous excavations in the summit of the right lung.* On the 18th, *metallic tinkling* was perceptible in the same points. Between this time and the end of December, the fever became greater and the emaciation greatly increased. Acute pains in different parts of the chest supervened; at the same time, the cough became more troublesome, and to the yellow opaque sputa there was now superadded a copious discharge of transparent and frothy mucus. Percussion of the thorax yielded a much clearer sound on the right than on the left side, where it was almost *dull* about the third rib; while the respiratory murmur was distinct in the latter, and not at all perceptible in the former, except along the vertebral column. The metallic tinkling also continued to be very audible on the right side. The patient lay almost constantly on the right side, the intercostal spaces of which could now be perceived to be wider and more prominent than natural, and the subcutaneous veins more obvious. All these symptoms indicated the supervention of a pleurisy, with effusion of both air and a liquid of some sort into the right side of the chest; and I accordingly added to my diagnosis—*Pleurisy with effusion, and pneumothorax.* Towards the end of January, the patient first perceived the fluctuation of a liquid in his chest when he turned himself: the same thing was very distinctly heard by the bystanders when the trunk was shaken in a sitting posture. It was difficult to distinguish by the naked ear on which side of the chest the sound existed, but the difficulty was immediately removed by the application of the stethoscope, (without the stopper,) the fluctuation being distinctly heard on the right side and not at all on the left. In February, the sputa amounted to about six ounces in twenty-four hours: they were yellow, opaque, and puriform, intermixed with bubbles of air, and swimming, as it were, in a large proportion of a transparent and diffluent mucus, in which there were sometimes streaks of blood. One day in this month, he expectorated, after a fit of coughing, as much as he usually did in the whole twenty-four hours. At this time the operation of empyema was performed, between the sixth and seventh ribs, by means of a trocar only one line in diameter. Two pounds of matter flowed in twenty minutes. This matter was puriform, opaque, of a slightly-greenish yellow colour, and scarcely fetid. As it flowed it was intermixed with some air-bubbles; and on settling, it separated into two portions,—the one, opaque and yellow, and composed of small yellowish flocculi,—the other, thinner and transparent. At the end of twenty minutes the discharge became intermittent, and each expiration was accompanied by the expulsion, with a loud sound, of a great quantity of air through the canula. The instrument was then withdrawn, and the natural retraction of the skin immediately destroyed the apposition of the wounds in the integuments and intercostal muscles. Immediately after the operation, the metallic tinkling was heard much louder than before. The patient felt relieved in proportion as the matter flowed, and this alleviation continued for two days, but he sunk on the 12th day after the operation.

On examining the body after death, we found that the succussion of the trunk produced the sound of fluctuation as before. On puncturing the right side of the thorax, which was larger than the left, a gaseous fluid escaped, and it was found to contain two pints of a sero-purulent fluid. The whole extent of the pleura, on this side, was lined by a thick layer of coagulable lymph, the consistence of which varied in different places, from that of soft cheese to one nearly equal to that of cartilage: it was softer on the surface, and more dense where it touched the pleura. It was several lines thick on the lungs, and on the right side of the mediastinum and diaphragm; it was thinner, softer, and more easily detached, on the pleura of the ribs and remaining portion of the diaphragm, both of which were of an intense punctuated red colour. The pleura of the lungs had none of this punctuated appearance, and the layer in contact with it, which was of a cartilaginous firmness, could not be detached from it. The lung was compressed towards the spine and posterior part of the ribs (to which it closely adhered,) so that it hardly occupied one-third part of the cavity. The pulmonary tissue was flaccid, but still somewhat crepitous, and permeable to the air in its posterior part. There were several tubercles in this lung, from the size of a cherry-stone to that of a filbert, and almost all softened to the consistence of curd. Five of these, of a somewhat larger size, quite softened and nearly empty, communicated on the one side with the bronchi, and, on the other, with the cavity of the pleura, by openings of from one to three lines in diameter. The left lung was of the natural size, and contained also a great many tubercles in different stages of maturity:—the greater number being small and diaphanous; a few, quite softened but not communicating with the bronchi. The mucous membrane was very red through its whole extent, and exhibited a small ulcer in the posterior part of the larynx. There was a small quantity of serum in the pericardium, and also in the peritoneum.

CASE XXXVIII.—*Acute pleurisy and pneumothorax in a phthisical patient.*—A man, aged twenty, who had been unwell (he said) for six months, and who had suffered from diarrhœa for the three last, came into the hospital in January, exhibiting all the usual symptoms of confirmed phthisis. The chest sounded badly on percussion on the upper part of the right side before, and on the upper part of the left side behind. Pectoriloquy was very evident on the right side, below the clavicle, in the axilla, and also on the shoulder between the upper edge of the trapezius muscle and clavicle. The patient remained long in a stationary state. In February the pectoriloquy was accompanied by the *veiled puff.* In the beginning of March a sudden alteration took place in the symptoms; the respiration becoming more difficult, attended with pricking pains in the right side, the pulse getting quicker, the skin hotter, and the face flushed. On examining the chest at this time by percussion and the stethoscope, it was found that it yielded a good sound over the whole anterior parts, and that the upper portion of the right side, which on the day before had yielded only a dull sound, now resounded more than the other; while the respiration was very perceptible on the left side, and not at all on the right. These symptoms I regarded as indicating pleurisy, arising from the irruption of tuberculous matter into the cavity of the pleura, and attended both by liquid and gaseous effusion. I wished further to ascertain the effusion by succussion of the chest, but the patient was too weak to undergo the trial, and he died four days after the marked change in the symptoms.

The fluctuation of the fluid in the right cavity of the chest was very perceptible, on succussion, after death. This side appeared, also, larger than the left; when struck it emitted a clear sound; and when punctured an elastic fluid escaped from it with a hissing noise. There was found in the cavity of the pleura a considerable quantity of a sero-purulent liquid, of a greenish-yellow colour, very frothy on the surface, and semi-transparent, notwithstanding the great portion of puriform fragments that floated in it. The pleura was lined throughout with an opaque albuminous exudation, of a yellowish-white colour, easily scraped off by the scalpel, and of the consistence of curdled milk. This layer was of considerable thickness on some parts of the ribs and diaphragm, and thinner on the lungs. The lung on this side was compressed into one third or one fourth its natural volume against the spine and mediastinum, to which last it closely adhered. It was flabby and very imperfectly crepitous through its whole extent, and contained hard tumours, which were evidently tubercles. On the closest examination no opening could be discovered on its surface. In the very summit of the superior lobe there were found three tuberculous excavations; two of which, of the size of an hazel nut, were full of soft matter, and the third, six times as large, and capable of containing a pullet's-egg, nearly empty. This vast cavity was lined by two membranes, the interior (that in immediate and close contact with the pulmonary tissue) of a semi-cartilaginous density, and the exterior soft, almost entirely opaque, and easily torn. The former existed only in some points; the latter was complete. On the anterior parts, this cavity was only separated from the surface by the thickness of the pleura and the two membranes just described; a state of parts which accounts for the phenomena of the veiled puff. The remainder of the lung was filled by miliary tubercles. The left lung appeared quite sound, only containing a few miliary tubercles.

Case XXXIX.—*Chronic pleurisy and pneumothorax occasioned by the rupture of a tuberculous excavation into the cavity of the pleura.*—A man, thirty-five years of age, while in an hospital for a chronic affection of the knee, was suddenly attacked, in January, with pleuritic symptoms, viz. head-ache, pain in the chest aggravated by respiration, frequent cough, and expectoration of white and very copious sputa. Getting better he left the hospital in the end of February, but returned again in March. On his admission into the Necker Hospital on the 14th, he presented the following symptoms: skin somewhat hot and dry, pulse frequent, dyspnœa, frequent cough with a slight expectoration of frothy mucus. The chest on percussion yielded the dead sound over the whole of the left side, and sounded pretty well on the right side. On the left side, respiration was inaudible except along the spine, and even here it was very feeble, and accompanied by a slight sibilous rhonchus: it was distinct on the right side. Pectoriloquy existed in the supra-spinal fossa of the right scapula. Succussion of the trunk produced no sound. In consequence of these signs the following diagnosis was given: *Phthisis, chronic pleurisy with considerable extravasation on the left side.* On the 20th March, doubtful pectoriloquy was found below the left clavicle; and on the 16th April, perfect pectoriloquy was found in the same place. The same symptoms continued, with increase of emaciation and cough in June and July. In August, diarrhœa supervened, with still greater cough and fetid purulent expectoration, to the amount, for a short time, of a pound and a half in the twenty-four hours. In October, there was again copious fetid expectoration, with dyspnœa and much cough, and inability to lie on the right side. At this time both sides yielded the same sound on percussion,* but respiration could be perceived in the right side only. Fluctuation in the left side was also perceptible on succussion, by means of the cylinder, but not without it. The patient said that a momentary attempt to lie on the right side increased the frequency of the cough, and greatly augmented the expectoration. He was not however, sensible of any fluctuation in the chest. He died in the beginning of November.

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* The return of natural sound on the left side, with the continued absence of respiration, indicated the development of pneumothorax.—*Author.*

On examination after death, the left side of the thorax was found larger than the right; the left intercostal spaces were wider and raised to a level with the ribs, while the right were sunk below that level. On puncturing the thorax on the left side, an extremely fetid gas made its escape with a hissing sound. On laying it open it was found to contain about three pints of a blackish-grey liquid, extremely fetid, and having somewhat of the smell of garlick. The lung on this side was compressed against the spine, and was not larger than the hand. Its surface was covered with a layer of a half-concrete white matter, intermixed with a very soft black substance. On it there were two openings of the size of the finger, which terminated, interiorly, in the substance of the lungs, in culs-de-sac not communicating with the bronchi. They were evidently the remains of tubercular excavations which had discharged their contents into the cavity of the pleura. The whole of the false membrane which invested the pleura was black and soft on the surface, but below this it was firmer and whitish. The right lung adhered to the pleura, throughout, by old attachments, and contained, internally, a great number of miliary tubercles. In its upper lobe there was an empty excavation, of the size of a filbert, lined by a well organized semi-cartilaginous membrane. In the middle of the same lobe there were found several white bands resembling ancient cicatrices. Two of these united in the form of the letter V, and contained between them a mass of tuberculous matter.*

CASE XL.—*Pneumothorax with pleuritic effusion.* A woman aged twenty-six came into the Necker Hospital in January, 1819, having been ill three months with what she called a cold. The chest yielded a middling good sound every where, except on the upper part of the left side, where the sound was duller. In the same place imperfect pectoriloquy, and also cavernous respiration, existed; and in the axilla of the same side, a distinct cavernous rhonchus was perceived. The diagnosis was therefore given—*Tubercles in the lungs; excavation in the top of the left lung.* As this patient was clearly in a hopeless state, she was not often examined. On the 17th March the *metallic tinkling* was found very distinctly on the upper part of the left side, which was now found to sound much better than the right. Respiration was good on the right side, but was inaudible on the left. I then announced that the Hippocratic succussion would occasion the sound of fluctuation; and this was found most distinctly to be the case, on trial. Pectoriloquy continued to be very distinct between the clavicle and second rib, and also in the supra-spinal fossa of the left side. In consequence of these observations I caused the following addition to be made to the diagnosis formerly [illegible]: *Pleurisy and pneumothorax of the left side produced by the discharge of a softened tubercle into the cavity of the pleura.* The patient died on the following night.

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* This case affords another proof of the cicatrization of tuberculous cavities, and also of their conversion into fistulæ.—*Author.*

Dissection twenty-four hours after death.—Upon puncturing the left side of the chest, a great quantity of gas, nearly free from smell, made its escape with a hissing noise; and upon laying it open, the cavity of the pleura appeared half-empty, the lung being compressed inwards and backwards and reduced to less than one-third its natural size. The surface of the pleura was here and there of a punctuated red, and its cavity contained about half a pint of a transparent fluid, slightly yellowish and interspersed with some whitish flakes. Nearly the whole upper lobe was closely attached to the costal pleura; and immediately below this adhesion, on a level with the third rib, there was an ulcer or aperture of the size of the nail, covered with a thick yellow mucus, from which a slight pressure forced out bubbles of air. This opening was the extremity of a very short fistulous canal of the thickness of the finger, which communicated with a vast excavation occupying a great part of the upper lobe, and nearly quite empty. Into this cavity, which was anfractuous and lined by a false membrane, two or three bronchial tubes, of the size of crow quills, were found to open. The right lung adhered throughout to the costal pleura, and contained many tubercles of the size of cherry-stones.

CASE XLI.—*Chronic pleurisy and pneumothorax with partial gangrene of the pleura.*—A man aged twenty-two, became affected, in the beginning of October, with a severe catarrh, which he attributed to drinking cold water while hot. This was followed by a constant cough and considerable hæmoptysis. He went into the hospital at the end of two months, and after remaining there a fortnight and being bled, his cough having become somewhat better, he left it. Having had a fresh attack ten days thereafter, he came into the hospital under my care. At this time he was affected with prostration of strength, impeded respiration, frequent cough with viscid, frothy and somewhat adhesive expectoration, and acute pain in the whole right side of the chest. Respiration was perfect over the whole of the left side, but was not perceptible on the right, except under the clavicle, and towards the roots of the lung, in which point there was a distinct crepitous rhonchus. Percussion gave a good sound on the left side; but this was less clear on the right side before, and was quite dull posteriorly. From these signs, I made out my diagnosis—*Pleuro-pneumonia of the right side.* The patient was bled three times, had leeches applied also three times, and was kept on low diet. After a continuation of this treatment the pain of the side disappeared, and the respiration became freer, but the patient did not recover strength, and he was, further, attacked with diarrhœa. Suspecting the existence of tubercles, I caused the patient to be examined with the stethoscope, by one of my pupils, who detected pectoriloquy about the right shoulder-blade. I further found at this time that the respiration continued to be very indistinct in the right side, while percussion elicited from it a much clearer sound than from the left. This fact, and the additional sign of the *metallic tinkling*, discovered at this time, convinced me of the existence both of pleuritic effusion and effused air (having a communication with the bronchi) in the right side of the chest. This was further confirmed by the noise of fluctuation produced by the Hippocratic succussion. There was, at this time, no appearance of œdema on the right side; the intercostal spaces were not at all enlarged; nor did the liver appear to be at all pressed downwards into the abdomen. However, as the patient had lost scarcely any flesh, and his strength seemed rather oppressed than exhausted, I entertained hopes of saving him by the operation of empyema. Immediately after this determination, the patient expectorated a very great quantity of a very fetid pus quite different from his usual sputa; and this was followed by increased difficulty of respiration, and other symptoms indicating a recent pneumonic attack on the left side. The operation was then performed, the incision being made between the fifth and sixth ribs, (counting from above,) about their middle; but no matter flowed, although the passage of air by the wound during respiration proved the penetration of the chest by the incision. Shortly afterwards he again expectorated a large quantity of very fetid pus, and died four hours after the operation.

On examining the body after death, the right side of the thorax appeared somewhat smaller than the left.* Succussion of the body produced the sound of fluctuation, but less distinctly than before death. On puncturing the right side of the chest, near the junction of the third rib with its cartilage, a large quantity of extremely fetid gas made its escape; and, on making a puncture about the middle of the fourth intercostal space, a very great quantity of pus flowed out: this was very liquid, of a slightly greenish-yellow colour, and of an intolerable gangrenous fetor. The whole of the fluid contained in this side of the chest amounted to about a pint-and-half. The lung was much flattened towards the mediastinum, being only an inch thick at its superior part; it gradually enlarged downwards, and at its inferior margin was two inches and-a-half in width. The lung had thus three sides;—the one internal, attached by means of short cellular adhesions to the mediastinum; the other anterior, of a triangular shape, and attached by old cellular adhesions to

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* This is contrary to the usual state of things in hydrothorax and empyema. In the present case it was the consequence of an anterior attack of pleurisy.—*Author.*

under being firmer than the upper. About the mi
fourth rib this membrane was pierced by a small ulcer
of the nail, which extended to the rib, and had all th
of one produced by the detachment of a gangrenous
somewhat similar ulceration, but extending only t
false membrane and subjacent pleura, was percepti
external side of the compressed lung. It had the
fetor, and was, obviously, an example of the partial
the pleura and false membranes. On the same exte
of the compressed lung, at its posterior margin, ther
more openings, which were found to communicate wit
tuberculous excavations in the substance of the l
filled with purulent matter. On blowing into the
made its escape into the cavity of the chest, into w
fistulæ opened, yet we could not detect the exact medi
munication with the bronchi. The substance of the lu
flaccid, was still crepitous, and contained some tuber
removing the lungs, it was evident that the side of th
much shorter than natural. The diaphragm was found
adhering anteriorly to the seventh rib, through two-t
length, the adhesion sloping backwards to the ninth r
leave on the lower and posterior part of the chest, a sp
de-sac, of not more than two fingers' breadth. T
parts accounted for the result of the operation. T
had penetrated through the diaphragm into the ca
abdomen, parallel with the upper surface of the liver.
lung was of the natural size, and contained in its up
cicatrice of the kind described in the chapter on pht
an inch in length, as wide as the finger, and of the t
two lines in its centre. Around this cicatrice the
tissue was quite sound and crepitous. A little lower,
the superior and posterior part of the same lobe, it was

The failure of the operation in the above case was inevitable: the same thing would have happened if the incision had been made three inches further back; and still more certainly had it been made in *the place of election.* I am not aware that this operation has before been frustrated by a similar obstacle. I apprehend so close an adhesion of the diaphragm to the pleura of the ribs must be very rare. In the present case I conceive it must be attributed to a pleurisy long anterior to that which caused the death of the patient. I have met with cases where the liver ascended as high as the fifth rib, and where the diaphragm lay in juxtaposition with the pleura, all the way from its natural attachments to this point, without there being any disease of the lungs or pleura. In such cases an attack of pleurisy must have produced the extensive adhesion described in the last case.

SECT. IV.—*Of the Metallic Tinkling in effusions into the chest.*

The metallic tinkling is scarcely ever found in the simple hydro-pneumothorax, that is, without communication with the bronchi. In this case, neither the respiration, voice, nor cough produces this phenomenon; but it sometimes takes place in another manner. Should the patient happen to raise himself suddenly in bed, and a drop of fluid fall from the upper part of the cavity of the pleura into the fluid beneath, it produces a sound like that occasioned by a drop of water, let fall into a flask three parts empty; and this sound is immediately followed by a very distinct metallic tinkling, of longer duration than that produced in another manner. (I shall give an example of this rare case at the end of the present section.) It is by means of the stethoscope that I have heard this modification of the tinkling; and I am doubtful if it could be heard without it. A pretty exact idea of it may be obtained by applying the instrument to the epigastrium of a person in the erect position, while he is swallowing a little water, drop by drop: and sometimes an analogous sound is perceived in the region of the heart, just as the individual has swallowed his saliva.—But if the phenomenon is rare in the simple hydro-pneumothorax, it is constantly observable during coughing, speaking, and breathing, in the case of a fistulous communication between the bronchi and pleura; or at least, the *utricular buzzing* is so, if the tinkling is not fully developed. And indeed these are the only signs which enable us to recognize the fistulous communication in question, in the case of empyema and pneumothorax: and such is their certainty, that this is not augmented by the co-existence of any other, not even the sudden and repeated expectoration of a large quantity of pus, which sometimes takes place in these cases, but which may be likewise the result of

unquestionably the most accurate and full of any that
written on diseases of the chest, contains five cases o
thorax with serous or puriform effusion (Cases XI. X
XLIII. XLV.) In no one of these, was the disease
during life; and in two of them (XLII. and XLIII.) th
effusion does not appear to have been discovered
death, although the existence of this appears clearly
dissection.

And yet Bayle was a practitioner who carried the p
diagnosis as far as ever any man did. Few, indeed,
sessed, in so eminent a degree, the qualities which c
good practitioner and correct observer. His acute and
ing genius was perceptible at first sight; and a v
acquaintance was sufficient to discover in him a mind
than comprehensive, and a most extensive erudition, ac
a study of the best writings, and by personal and
researches, pursued to an extent and with an assidu
superhuman.* Endued with a vast power of attention
patience which nothing could rebut or weary, applicati
a part of his natural character; and no one of his frie
low-labourers ever perceived that fatigue, discourag
negligence made him, on any occasion, omit to do all
thing that was proper to be done. Religious, more
stedfast in his principles even to severity, from a mere
of duty he attended as carefully to the patients who h
prospect of supplying him with information, as to th
cases were the most curious and interesting; and yet,
stances now under consideration, he did not discover th
and even in two of them he seems to have quite over
pneumothorax, after death, although this appears cl

percussion, it is hardly possible to discover pneumothorax during life; and when this has been the case, the air may easily escape notice upon examination of the body.

In some instances wherein I have had the attendance of several of my medical brethren, while verifying by dissection the stethoscopic indications, I found that some of them were of opinion that the preternatural or tympanitic resonance, on percussion, is of itself sufficient to point out pneumothorax. This might certainly be so, at least in some extreme cases; but I am doubtful if such a thing ever actually occurred. Bayle employed percussion in the case of all his patients; and the five above mentioned had been subjected to the same trial. On a former occasion I related a case (Case XV.) in which this physician did detect pneumothorax by means of the co-existence of the tympanitic sound and the dilatation of the chest: but this was in the dead body; and we know that percussion affords much more marked results in the case of a subject stretched on the table of a dissecting room, than in that of a living body in bed. The same thing is true of the inequality of size in the two sides of the chest, which is very perceptible in the naked body, though hardly discoverable in a person with merely a shirt on.* Neither Avenbrugger nor Corvisart mention pneumothorax; and yet both of them must have seen examples of it, especially the latter, both in the living and dead body: for this disease is by no means so rare, as to make it possible to be in the habitual examination of the living and dead body, for several years together, without meeting cases of it. Even in the instance of the tympanitic sound combined with dilatation of the side, there still remains the uncertainty whether the larger side is really preternaturally dilated, or the other is contracted in consequence of pleurisy. And when the dilatation of the side either does not exist or is not perceived, we will be liable to a more serious error, that, namely, of considering the side which sounds well, as healthy, and the other as the seat of pneumonia or pleurisy: and, in fact, this is the conclusion come to by all the physicians to whom I showed my cases of pneumothorax, previously to communicating to them the indications of the stethoscope. The only instance wherein percussion will supply positive results, is that in which air and liquid co-exist; and these results will be obtained by that method of which I have shown the inefficacy in the case of simple hydrothorax or pleurisy,—I mean, percussion exercised in different positions of the chest. In these circumstances, the gas rising always to the the part of the cavity which is superior, the sphere of the dead sound will vary with each posture of the patient. But indepenrisk of the mistakes which might still be occasioned in such cases by adhesions of the lungs, the great inconvenience of such a method, both to the patient and physician, will prevent its being used, except where the nature of the affection is already ascertained.

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* The argument here used is invalid; as, assuredly, no physician would fail to examine the *naked* chest under such circumstances as those contemplated in the case in question.—*Transl.*

If the cases observed by Bayle, and those which must have been seen by Avenbrugger and Corvisart, had come before a physician acquainted with the practice of mediate auscultation, they must of necessity have been recognized. The metallic tinkling by itself would, in several cases, have pointed out the whole complicated character of the disease, viz. the pneumothorax, the accompanying fluid, and the fistulous opening between the pleura and the bronchi. In the cases in which this communication did not exist, the absence of the respiratory sound would have led him to percuss the chest; and the results obtained from percussion,—pointing necessarily either to pneumothorax or emphysema of the lungs,—would have led to the exploration of the whole chest, and consequently to the discovery of the actual disease. Having proved the affection to be pneumothorax, he would have ascertained whether it was simple or complicated with liquid effusion, by means of the Hippocratic succussion.—I am far from wishing to throw blame on the excellent observers just named, for what they did not do. I have been merely desirous of showing that various methods may be combined, with great advantage, to obtain the end in view; and that this combination is infinitely more certain in its results than the method which has been hitherto exclusively employed.

CASE XLII.—*Pneumothorax and subacute pleurisy, in a phthisical subject.* A man, aged twenty-nine, caught a severe catarrh from exposure to much cold in the beginning of October, 1818, which he neglected, as he had done a cough with which he had been affected in the preceding spring. This catarrh, after a few weeks, was followed by spitting of blood for several days, and, subsequently, by a continual cough, dyspnœa and emaciation. On the 5th of February, 1819, he came into the Necker Hospital. At this time he was evidently in a confirmed consumption—being affected with great emaciation, frequent cough, yellow opaque sputa, dyspnœa, diarrhœa, and *pectoriloquy* below both clavicles, evident on the left, doubtful on the right side. Things continued much in the same way until the 17th, when at the hour of visit I found the patient agitated and exhausted, with quicker pulse and hot skin. Presuming that a slight pneumonia had supervened to the tuberculous affection, I explored the chest with the stethoscope. The respiration was inaudible on the left side anteriorly and laterally, although the chest was fully dilated at each inspiration: behind, over the roots of the lungs, it was perceptible, but in a less degree than natural; percussion yielded a good sound every where. Having the cylinder applied to the chest below the left clavicle, as the patient placed himself in a sitting posture, I heard distinctly a sound like that produced by a drop of liquid let fall into a flask containing a very small quantity of water; and this sound was followed for a second, by a tinkling such as is occasioned by striking a glass with a pin. Neither the voice, cough, nor respiration, was attended by any sound of the same kind. The respiration was good on the right side, but was accompanied by a rhonchus, which was sibilous, sonorous, and mucous, in different points. The whole of this side sounded much less than the other; indeed the sound was comparatively quite dull. These signs pointing out, with certainty, the existence of pneumothorax on the left side, I had the patient undressed in order to see if this side was dilated: some difference seemed observable, particularly on the lower part, but it was so slight that we could be by no means certain of it. Suspecting from the metallic tinkling that there existed a small effusion of liquid along with the pneumothorax, I applied the test of succussion, and heard, both by the stethoscope and the naked ear, the sound of fluctuation, apparently in the left side. I added, in consequence, to my diagnosis—*Pneumothorax with a small effusion of pus in the left side of the chest;* and subjoined an opinion, founded on the absence of the metallic tinkling during coughing and speaking, that the effusion did not originate in the rupture of a softened tubercle into the pleura and bronchi. Seeing no other means of relieving the patient, I proposed the operation of empyema. This, however, was not performed, as he died the same day, although at the hour of the visit there did not seem any thing indicative of so sudden a termination of his disease.

On examining the body after death, the left side of the chest appeared to me evidently enlarged; but this was doubted by some of the persons present. On percussion it certainly yielded a much clearer sound than the other, and succussion of the trunk produced the noise of fluctuation. On puncturing the thorax with a scalpel on the left side, a nearly inodorous gas continued to escape, with a hissing noise, for nearly a minute; and, on opening it, it was found three-fourth parts empty, the lung being found only of one-third its natural size, and compressed towards the mediastinum, but without adhering to it. In the same cavity there was nearly a pound of a liquid resembling whey, of a whitish colour, turbid, and containing portions of yellowish half-concrete albumen: it was quite covered with transparent bubbles, exactly resembling those produced by agitating or blowing into soapy water. The whole of the lung, on this side, was covered with an irregular albuminous membrane, which in several places greatly resembled an omentum moderately loaded with fat. In the top of the superior lobe there were two excavations, containing only a soft tuberculous pus, and each capable of holding a walnut. But these were lined with a double membrane, and communicated with bronchial tubes. The whole lung was filled by tubercles, in every stage of their progress. The upper lobe of the right lung adhered to the pleura, and contained a series of large tuberculous excavations, partly empty, and all lined by the semi-cartilaginous membrane. This lobe further contained many immature tubercles: the other lobes were sound.*

In reviewing the series of signs detailed in this chapter, we perceive that pneumothorax is not only of easy recognition, but that each of its varieties may be readily distinguished from the others. These varieties, in a diagnostic point of view, may be reduced to the following: 1. simple pneumotharax; 2. pneumothorax with liquid effusion; 3. pneumothorax with liquid effusion and fistulous opening between the bronchi and pleura. In the first of these cases, the affected side sounds, at least, *well*, and sometimes is preternaturally sonorous; while the respiration is not at all perceptible.† When pneumothorax is combined with liquid extravasation, the same signs exist, with these in addition: the most dependent parts of the chest yield a dull sound, and these parts vary with the position of the patient; and the Hippocratic succussion gives the sound of fluctuation. In the third variety, to all the preceding signs we have to add the metallic tinkling or amphoric resonance, which commonly alternate.‡ The two first varieties cannot be confounded with any other affection; the last presents signs very analogous to those afforded by a vast tuberculous excavation nearly empty. But even here a mistake is very unlikely. In the pulmonary excavation, we have some remains of pectoriloquy: the sphere of the tinkling, amphoric buzzing, and tympanitic resonance on percussion, is very circumscribed; and there is no fluctuation on succussion, while the cough sometimes occasions a guggling or slight fluctuation, which is never the case in pneumothorax.§

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* In the eight cases of pneumothorax above detailed, the disease appears to have equally affected the two sides of the chest; in two cases formerly given (Cases XV. and XVI.) the site of the affection was the left side: the result of the whole being six on the left and four on the right side. The collation of all the known cases of pneumothorax (forty-nine in number) by M. Reynaud, gives thirty-two on the left, and seventeen on the right. (Journ. *Hebdom.* Avril, 1830.) It would thus appear that pneumothorax,—the reverse of tubercles, with which it is nevertheless almost always connected,—is generally more frequent on the left than on the right side. I do not, however, think that the number of our observations are yet sufficient to justify our establishing an absolute rule as to relative frequency of site of this disease. (*M.L.*)

† We must here except the rare case, formerly mentioned, where the puerile respiration of the sound lung is heard *through* the diseased side.—*Author.*

‡ The precise period of occurrence of this last variety is commonly indicated by a particular set of symptoms formerly noticed, and to which M. Louis has more particularly called attention; (*Rech. sur la Phth.* p. 445;) viz. sudden acute pain on one side of the chest, accompanied with a strong sense of suffocation and great anxiety. Sometimes, however, the pain and suffocation are not sufficiently marked to attract the attention of the patient or his medical attendant; and these symptoms are, consequently, only of value when they harmonise with the stethoscopic signs. (*M.L*).

§ I here subjoin a brief summary of the principal diagnostic signs of pneumo-

Treatment.—The exact diagnosis of pneumothorax, and of each particular variety of it, must not be considered as a matter of purely speculative knowledge, or as useful only in respect of the prognosis of the disease. It is extremely probable, as has been remarked by Hewson* and Rullier,† that simple pneumothorax is the case which holds out most prospect of success from the operation of puncturing the chest. This opinion is corroborated by an observation of Riolan, who informs us that he had several times seen the operation of paracentesis successfully performed on patients considered as affected with dropsy, but from whose chests only air made its escape.‡ In cases of this kind, the puncture with the trocar would unquestionably be preferable to incision. But I would here remark, that, exclusively of the great infrequency of the simple pneumothorax, I think it must be generally considered as of no great severity, the gas being more readily absorbed than the liquid effusion. I think myself justified, at least, in drawing this conclusion from the frequency of gaseous effusions in other situations, which disappear spontaneously, and frequently in the course of a few days or even hours. Of this kind is the pneumo-pericardium, and the various kinds of *pneumarthrosis*, particularly that of the knee, which so frequently arises during the convalescence from articular rheumatism, as well as in other circumstances. On this account, before proceeding to puncture the chest, we ought to endeavour to excite absorption by aromatic and spirituous frictions, and by the internal use of slight tonics.

Pneumothorax complicated with liquid effusion and still more with pulmonary fistula, is a case of a most serious nature, and leaves little hope of a cure being effected. This, however, must not be considered as quite impossible, even in the severest cases. I formerly proved the possibility of the cicatrization of tuberculous excavations; and the observations of Bacqua, Jaymes and Robin, (Journ. Gén. de Méd. 1813,) to which I could add a more recent case of the same kind, (I mean cases where the patients recovered after the operation of empyema, although the

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thorax, with the estimated value of each, from the very valuable Treatise on Pneumothorax by Dr. Houghton, in the Cyclopædia of Practical Medicine. The young practitioner will find his advantage in referring to this recapitulation after perusing the text of our author and the various notes which have been appended to this. "1. The sensation of something giving way in the chest, and of air entering the pleural cavity: *very valuable, but often absent or unnoticed.* 2. In a phthisical individual, the sudden supervention of overwhelming dyspnœa and pain: *rarely absent, therefore very valuable; still more so if succeeding last sign.* 3. Comparison of auscultation and percussion. Nullity of respiration over one side, together with tympanitic clearness of sound, which below terminates abruptly in complete dulness: *if accurately established, amounting to positive certainty, but sometimes not easy to establish: Ægophony rare.* 4. Fluctuation on succussion: *positive certainty, but should be unquestionably verified.* 5. Metallic tinkling: *positive certainty, but should be unquestionably verified.*"—*Transl.*

* Med. Obs. and Inq. v. iii. p. 72.

† Dict. de Sc. Méd. *art.* Empyeme.

‡ Enchyrid. Anat. l. iii. chap. ii.

injections thrown into the wound were found to be discharged by the mouth,) sufficiently prove, that, even in such cases, we may adopt the mode of cure just named, with some prospect of success. Even nature by herself may sometimes overcome, more or less completely, a lesion of the kind in question, as I shall show in a case to be detailed at the end of the present chapter. I saw another case of the same kind, in 1820, in a man who came on horseback thirty leagues, to consult me. In this person there was every sign of the complication in question existing on the right side. The disease was of two years' standing, and nature had already made considerable progress towards a cure, as the affected side was evidently contracted. I ascertained in 1824 that this man was still alive, and attending to his business; he was improved in health, though still an invalid. It cannot be denied, however, that cases of this kind are exceptions to the general rule; and that the two last varieties of pneumothorax afford much less chance of success from the operation of empyema, than the simple effusion, whether of air or liquid. Accordingly, I think that we ought never to attempt this operation in such cases, unless there is imminent risk of suffocation, or rapidly increasing emaciation and debility; and never after the long continuance of the disease, unless the lung on the sound side gives no indication of tubercles. In every other case, I think that we ought to content ourselves with supporting the patient's strength, promoting absorption by the means formerly mentioned, and by a regimen regulated according to the state of the digestive functions,—neither too rigid nor too analeptic.

CASE XLIII.—*Pleurisy with contraction of the chest, and pulmonary fistula opening outwards.*—A boy, twelve years of age, was attacked with a severe pectoral affection, marked by violent cough, acute pain of the side, dyspnœa and fever, followed, in a few days, by considerable hæmoptysis, and, subsequently, by expectoration of a purulent fluid in great quantity. The disease then took a chronic form; and in the course of a few months, an abscess pointed externally between the cartilages of the seventh and eighth ribs, which, when open, discharged a considerable quantity of pus. Since then (now six years) the aperture had remained fistulous, daily discharging one or two spoonsful of pus. Occasionally, during a temporary obstruction of the orifice, the expectoration of this patient had become augmented, and the sputa had been then always perfectly like the pus usually evacuated from the abscess. At this period I examined the boy. He was much emaciated, but not like one wasted by consumption, the emaciation being confined rather to the bones and muscles, than to the cellular membrane. He was extremely small for his age. The left side of the chest was at least one-third narrower than the right, and this contraction was not remarkable at the inferior margin and in the antero-posterior diameter. On examining the thorax the whole right side yielded a clear sound on percussion, but one less distinct on the left. The respiration was quite distinct over the whole of the right side; it was very indistinct in the superior part of the left side, and quite inaudible in the whole inferior portion. Pectoriloquy, also, existed in the lateral and superior part of the same side.

From circumstances of the above case it is evident that, in the first instance, the maturation of one or more tuberculous masses had been attended by an acute pleurisy; that, although the tubercles, when softened, had been expectorated, yet that a communication between the remaining excavations and the pleura had been subsequently established, which had given rise to the external abscess. The eventual formation of a fibro-cartilaginous membrane had produced the union of the lungs and pleura, and the consequent contraction of that side of the chest. As this patient has already lived so long with this affection, it is probable, if the expectoration does not greatly increase, that he may survive a long time yet. Willis relates a case similar to the above, in so far as regards the possibility of a cure after the operation of empyema. In this case the fluctuation of the liquid effused into the chest was heard. The patient was cured, but the wound produced by the operation remained fistulous.*

SECT. V.—*Of double Pneumothorax.*

It is by no means very uncommon to perceive the escape of a small quantity of air (discovered by the hissing sound) from each side of the pleura, on opening the chest in the dead body. Accumulations of air of this kind are commonly small in quantity, are usually combined with a small portion of liquid, and must be considered as the product of the changes immediately preceding death. But double pneumothorax occurs under other circumstances; though it is certainly extremely rare. I shall here give a brief note of the only two cases I am acquainted with. In the year 1814 M. Recamier had under his care in the Hôtel Dieu, a man about sixty years old, who came into the hospital labouring under an attack which resembled asthma. The face was swollen, the lips and cheeks purple, the feet cold and œdematous, the pulse small, hard and intermittent, the action of the heart strong and irregular, with extreme dyspnœa and distressing cough. The chest was large and rounded, and yielded a good sound on percussion. The patient died after a few days.

A great quantity of air made its escape on puncturing each side of the chest. The lungs were compressed against the spine, and did not exceed the size of the hand; they were dry on the surface, but were in other respects sound. The pleura was healthy, but was detached in many points from the ribs by bubbles of air contained in the subjacent cellular substance. The heart was slightly hypertrophied and dilated. I myself saw a similar case in 1816 in the person of a patient in the earlier stages of phthisis, who was suddenly seized with extreme dyspnœa and frequent faintings, and died three days thereafter. The lungs were found reduced to one-third their natural size, and compressed upon the mediastinum. Each cavity of the pleura contained about a pint and half of limpid serum and an equal volume of gas. The lungs contained only a small number of miliary tubercles. Cases of this kind are beyond all the resources both of nature and art.*

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* Op. Om. Sect. I. cap. xiii. lib. ii. De Médicament. Operat. p. 215.

CHAPTER V.

OF ACCIDENTAL PRODUCTIONS DEVELOPED IN THE PLEURA.

SECT. I.—*Of Accidental Productions which are usually accompanied with liquid effusion.*

THE accidental productions of the pleura which are commonly accompanied by a liquid extravasation or chronic inflammation, are chiefly of a cancerous or tuberculous kind. The first are most commonly of the medullary species of cancer. They adhere strongly to the membrane, and consist of masses of variable size, but rarely larger than an almond. They are usually surrounded by increased redness of the pleura, produced by an infinity of finely ramified vessels; and we sometimes observe little black lines stretching from their base over the adjoining pleura, produced by melanose matter. Tumours of this kind are seldom numerous.—On the other hand, the tubercles of the pleura exist usually in very great numbers, and vary in size from that of a millet seed to a hemp seed. They are placed very close together, and are frequently connected by means of a very soft semi-transparent false membrane. When we have an opportunity of observing this species of production near the period of its formation, we can sometimes scrape off the false membrane, and the greater number of the tubercles along with it; a circumstance which seems to prove these bodies to be developed in this membrane, and to appertain to it rather than the pleura. At an ulterior stage, the false membrane is no longer perceptible, having become organized, and cemented with the pleura, which then appears as if thickened. The tubercles, in this case, are extremely adherent, and seem implanted in the very substance of the pleura. Sometimes the tubercles are in their first stage, that is, semi-transparent, greyish, or almost colourless; at other times they are in the second stage, or yellow and opaque. I have never found them softened. The intermediate portions of the pleura are frequently very red, and even injected very distinctly with blood-vessels. In this state the pleura has very much the appearance of the skin in certain miliary eruptions.—Although, as I have said, the tubercles most commonly originate in a false membrane, they may, nevertheless, be developed in the very substance of the serous membrane, and indeed in any membrane, without any sign of preceding inflammation discoverable before or after death. We occasionally also meet with another species of granulations on the surface of the pleura, consisting of small, opaque, white grains, of a flattened form, placed close to one another, and resembling, from their great density, the fibrous membranes. This species of eruption, which is likewise accompanied with thickening of the pleura, appears to me to be the consequence of an imperfect process of organization in a granulated false membrane of the kind formerly described.* The two last-mentioned productions are not often met with on the pleura; but are extremely common on the peritoneum. Bichat first noticed these bodies, but he does not seem to have well understood their nature. They are always attended with hydrothorax. This is usually the case with the cancerous productions also; but by no means so constantly as the others. In all cases, the effused serum is almost always red or bloody. When the extravasation has taken place, it will always be discoverable by the stethoscope; but this instrument affords us no aid in discovering the primary cause of the effusion: we can in this respect derive assistance from the general symptoms only.

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*LITERATURE OF PNEUMOTHORAX.

1803. Itard, (E. M.) Diss. sur le Pneumothorax. *Par.* 8vo.
1820. Piorry, Dict. des Sc. M. (Art. *Pneumato-thorax.*) t. xliii. 8vo. *Par.*
1827. Chomel, Dict. de Med. (Art. *Pneumatose.*) t. xvii. *Par.*
1834. Houghton, Cyc. of Pract. Med. (Art. *Pneumothorax.*) vol. iii.

Besides the above treatises, there are numerous cases recorded in the periodical literature of this and other countries since the distinct recognition of the disease by Laennec; also several others incidentally noticed, particularly by surgical writers, before the nature of the affection was understood. In a considerable proportion of the cases published under the name of *Empyema*, pneumothorax has been a concomitant.—*Transl.*

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* These are the granulations formed by *the rudiments of false membranes*, (see *note*, Chap. on Phthisis) which Andral considers identical with the grey tubercular granulations. The reader must judge whether there is or is not, in reality, some difference between *flattened*, *white*, *opaque* grains, and *roundish*, *greyish* or *nearly colourless*, *semi-transparent* grains: they are both *hard*.—(*M. L.*)

SECT. II.—*Of Accidental Productions of a solid kind.*

The pleura, like all the serous, and even mucous membranes of the body, may be so altered in its nature as to secrete tuberculous or cancerous matter in place of its natural fluid. This matter may be formed in such quantity as completely to fill one of the cavities of the chest compressing the lungs upon the spine. This is a very different case from that already mentioned, of the development of tubercles on the surface of the pleura: in the latter case the tuberculous matter is not secreted by the pleura, but originates in the false membranes of pleurisy. Such morbid productions as we now are considering are very rare. There is no well-described case of the kind on record: but I apprehend those scirrhous masses mentioned by authors as filling one of the thoracic cavities must be of the kind in question. Boerhaave appears to have found the medullary tumour, or soft cancer, in this situation in the person of the Marquis of St. Aubin.* Corvisart met with a case of the same kind; and M. Recamier found in the body of a patient, whom he considered as affected with empyema, the whole of one of the cavities of the chest filled with a mass of tuberculous matter. Haller, as I formerly observed seems to have met with a large quantity of the matter of melanosis in the same cavity.† In two instances I have myself discovered a considerable quantity of tuberculous matter in this situation. In both these, the matter was in different degrees of consistence. It was most solid at the bottom of the cavity, and over the whole of the surface of the pleura, on which it formed a layer of more than an inch thick: the remainder of the matter was quite soft, and was contained in the centre of this sort of cyst. The following case, communicated to me by M. Cayol, is a third instance of the same kind.

CASE XLIV.—*Tuberculous mass developed in the pleura.*—A negro child, six years of age, entered the children's hospital in 1807. Nothing respecting his previous history could be ascertained. At the time of his admission, he had a deep and painful ulcer on the temple, constant diarrhœa, frequent dry cough unaccompanied by dyspnœa, and irregular fever. He died, gradually exhausted, in less than a month.

Dissection twenty-four hours after death.—The bones in the vicinity of the ulcer were found extensively diseased, and partly removed by caries. On the outside of the cranium there was two tubercles, one of the size of a large nut, and the other less by one-half. They were not encysted, and were entirely composed of tuberculous matter in the first degree of softness. One of them was contained in a hollow on the surface of the cranium. On opening the thorax the right lung seemed completely transformed into one tuberculous mass; but a more close inspection showed it to be compressed by this tuberculous growth, which was contained in, and completely filled, the cavity of the pleura. This matter was of the consistence of cheese, and exhibited no distinct tubercles. It was about the thickness of two fingers on the anterior and posterior parts of the lung, and somewhat thinner on the side. A portion of it, of the size of a walnut, had formed a passage outwards between the seventh and eighth ribs, (which were carious,) and adhered to the skin. This portion was as fluid as pus in its centre. Another portion united the diaphragm to the base of the lung, and also to the ninth and tenth ribs. On detaching this layer from the surface of the pleura, this, in place of being smooth, was found uneven, like the surface of the cysts of tubercles; and some very short fibres, like a fine cellular tissue, extended from it into the morbid production. In the midst of this mass, the lung, compressed to one-fifth of its natural size, was found, in other respects, sound, and did not contain the slightest trace of tubercles. There was a small quantity of serum in the left pleura, and also in the cavity of the peritoneum, and the liver was not quite sound. The mesentery, and other viscera, were in their natural condition.

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* See Zimmerman, Traité de l'Expérience.

† This is the variety of soft melanosis, formerly referred to in the notes to the chapter on melanosis, and constituting the fourth form of this affection noticed by Laennec. We must remark, however, that the black striæ observed in such cases on the pleura or other serous membranes, are rather the result of black matter impregnating an accidental tissue, than of the matter of melanosis deposited on the surface of the membranes.—(*M. L.*)

In considering the means of discovering a case of this kind during life, it would seem, at first, that the stethoscope could only indicate the total absence of respiration, and could not, therefore, enable us to distinguish such an affection from pleuritic effusion, hydrothorax, or even from peripneumony arrived at the stage of hepatization. I am however of opinion, that a careful and repeated exploration might lead us nearer to the knowledge of the truth, if it did not quite discover it. The case in question might be distinguished from pleurisy and hydrothorax by the circumstance, that in these, the loss of the respiratory sound is sudden, whereas in the case of the tumour it must begin almost insensibly, and gradually and slowly arrive at its height. The want of ægophony in the latter case would also aid the diagnosis. In the case of pneumonia we have the crepitous rhonchus in the earlier stages; and in the latter stages we should not have the respiratory sound at the roots of the lungs, which would be found in the case of the tumour, even after this had reached a great size. It must be admitted, however, to be impossible to distinguish the cases in question, if we only see the patient in the advanced stage of the affection.

SECT. III.—*Of Accidental Productions developed on the adherent or outer surface of the pleura.*

Tumours of different kinds are sometimes found developed between the pleura of the ribs and thoracic parietes. I have met with, in this situation, only the medullary tumour, tubercles of small size, and cartilaginous incrustations; which latter bodies are flattened and frequently imperfectly ossified. These are commonly considered as thickenings of the pleura; but I am well assured that this is a mistake; as is also the supposed thickening of other membranes, such as those of the spleen, the albuginea, the inner membrane of the arteries, &c.* I have met with cartilaginous incrustations of the pleura, as large as the hand, and more than half an inch thick in the centre, which seemed to have produced hardly any symptoms of disease. Haller found, in this situation, an immense cyst, containing a serous fluid, and compressing the lung to the size of the hand.† M. Dupuytren found two enormous cysts of the same kind, in the body of a young man, who died of suffocation, after having long laboured under a progressively increasing dyspnœa. Each of these nearly filled one of the cavities of the chest, and compressed the lungs into a small compass on the anterior part of the cavity. "These cysts were eleven inches long: their walls were lined with a great many albuminous layers, having on them, in some places, very fine granules, and in others small vesicles."‡ From these expressions it is probable that these cysts may have contained *acephalocyst-hydatids.* In cases of this kind, I think the attentive consideration of the progress of the disease and the signs furnished by percussion and auscultation, might lead to a sufficiently correct knowledge of the affection to prompt and justify the operation of empyema. And this would probably be frequently successful, particularly if followed by injections to produce the inflammation and adhesion of the cyst. I am aware that this latter practice might probably be sometimes dangerous; but in a disease necessarily fatal—*melius est anceps experiri auxilium, quam nullum.*

SECT. IV.—*Of Diaphragmatic Hernia.*

In cases of wound, some part of the abdominal viscera has passed into the thorax.§ The same thing has followed a rupture of the diaphragm, occasioned by a fall, by great exertion,[*] or by an enormous distension of the stomach.[†] The same derangement has taken place from original malformation of the diaphragm;[‡] and even by the natural openings in that muscle.[§] Instances have occurred in which the stomach and the intestines have been found in the left cavity of the chest.—A case of this sort would be easily recognized by the stethoscope, from the absence of respiration in the chest, and the presence of borborygmi there. In a case of this kind, discovered shortly after its occurrence, would it be justifiable to make an incision into the abdomen and draw back the intestines?—There is another species of hernia, quite as rare as that just mentioned, and which might also be discovered by means of the stethoscope,—I mean a hernia formed by the lungs through the intercostal muscles. Grateloup has published a case of this kind, which was produced by violent coughing.[‖] Boerhaave records a similar instance arising from the exertions during labour[¶]; and Sabatier mentions another supervening to the cicatrization of a bayonet-wound between the fifth and sixth ribs.[**] A fourth example is given in the third volume of Richter's Journal. In a case of this kind, the stethoscope would at once detect the respiratory sound in the tumour, and thus discover its true character.

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* Dict. des Sc. Med. Art. Cartil. Accident.

† Opusc. Pathol. obs. xiv.

‡ Essai sur l'Anat. Path. par J. Cruveilhier. Paris, 1816.

§ Ambroise Paré, liv. ix. ch. xxx.—Leblanc, Traite d'Oper. t. ii. p. 410.—Fabric. de Hild., Cent. ii. obs. xxxii.—Fanton, Obs. Med. p. 167.

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[*] Journ. de Desault, tom. iii.—Richter on Herniæ.

[†] Haller, Disput. Chir. tom. iii.

[‡] Hist. de l'Acad. Roy de Sc. 1722. Ibid. 1772.

[§] Richter, Op. Cit.

[‖] Journ. de Méd. t. liii. p. 416.

[¶] De Haen Prælect. in Boerh. Ins. path. t. i.

[**] Méd. Oper. t. ii. p. 167.

PART THIRD.

DISEASES OF THE HEART AND ITS APPENDAGES.

BOOK FIRST.

OF THE EXPLORATION OF THE ORGANS OF CIRCULATION.

So late as the close of the last century, affections of the heart might still be classed among those diseases which are the most imperfectly known. They were considered as uncommon; and notwithstanding the labours of Lancisi, Morgagni, and Senac, the common run of practitioners knew of no other cases than that of *polypus of the heart* (an imaginary disease in their acceptation of the term) and *palpitation*, which they considered as a nervous affection. The researches of the authors just mentioned, and those of Corvisart, made us acquainted with many organic lesions of the heart, but threw little light on the signs of these; insomuch that, in the state in which the science was left by them, it was perhaps impossible to distinguish, with any certainty, one disease from another.

The positive signs of the organic diseases of the heart are derived partly from percussion, but chiefly from auscultation: and by means of them also many of the common symptoms produced by disorder of the functions, and in themselves extremely vague, acquire occasionally a much greater degree of certainty. The application of the hand, the only method in use before the time of Avenbrugger, furnishes us, in most cases, with no result whatever, and frequently deceives us in respect of the actual force of the heart's impulse or shock. It indicates less accurately than the pulse at the wrist, the regularity or irregularity of its contractions; it is, in fact, useful in one particular case only, that of the existence of the peculiar vibration or thrilling (analogous to the *purring* of a cat) which will be hereafter described. Even percussion supplies us with only accessory or corroborative signs, which may frequently be wanting.

In reference to exploration, we must notice two cardiac regions, the right and left; the first comprising the space covered by the lower third of the sternum; the second, that which corresponds to the cartilages of the fourth, fifth, sixth, and seventh sternal ribs.—The right cardiac region naturally yields a very clear sound. Hypertrophy of the ventricles, the dilatation of these or of the auricles, a vast accumulation of blood in all the cavities of the heart, the growth of much fat around this organ, and effusions into the pericardium, may render the sound dull or dead. The same causes may produce the same effect in the left cardiac region: but in this case the sign would be less conclusive, inasmuch as this region naturally yields but little sound in most persons, and hardly any in fat or œdematous subjects, or even in such as are very muscular. It is very uncommon for the sound to be wanting in either region, as high as the site of the auricles: and if it is so, it indicates an enormous dilatation, such as exists only in the case of contraction of the mitral orifice.

The alternate contractions of the auricles and ventricles of the heart give rise to sounds very distinct, and of different kinds,[*] so as to enable us to study the actions of that organ even more exactly than by the dissection of living bodies. The truth of this seemingly paradoxical assertion rests on the fact, of the ear judging much more correctly of the intervals of sound, than the eye of the intervals of motions corresponding to these. And yet notwithstanding this advantage, we must still admit with Haller, that the analysis of the movements of the heart is difficult, and requires great attention. Certain of the phenomena of the sound organ, are especially difficult to be accurately ascertained. It is fortunate, however, that the results which lead to practical consequences are more easily obtained, and require no extraordinary attention; and, indeed, the most important of all, in this respect, are such as can hardly escape the notice of the least attentive and least experienced observer. The movements of the heart must be studied under four principal heads; viz. 1st, the extent over which they can be heard by means of the stethoscope; 2nd, the shock or impulse communicated by them; 3rd, the nature and intensity of the sound; and 4th, their order or rythm. Before commencing this analysis of the heart's actions, I must make one observation, on which I shall have occasion to return again and again: it is this—that of all the organs in the body, the heart is perhaps that which is the least frequently in the most favourable

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[*] It will be seen hereafter that Laennec's opinion of the two sounds of the heart being produced by "the alternate contractions of the auricles and ventricles," is far from being confirmed by the observations of his successors: indeed there can be little doubt now in the mind of any one, that our author's views on this point are incorrect. Feeling it my duty, however, to render the text faithfully, and yet being anxious to guard against mistake, I would recommend that, in the perusal of the present Part, the reader should endeavour mentally to substitute the words *first sound* for our author's expression *contraction of the ventricles*, and *second sound* for *contraction of the auricles*. He will thus retain *the facts*—all that is necessary for practical purposes—whatever explanation of them he may hereafter be led to adopt.—*Transl.*

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slight disproportion between it and other organ
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CHAPTER I.

OF THE EXTENT OF THE HEART'S P

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The motions of the left cavities are chiefly

former place, those of the right cavities in the latter. This is so much the case, that, in disease of one side of the heart only, the pulsations in these two situations give quite different results. When the sternum is short, the pulsations are perceived in the epigastrium. In very fat subjects, the pulsations of whose hearts are quite imperceptible to the mere touch, the space in which they can be detected by the stethoscope is sometimes not more than an inch square. In thin persons, in the narrow-chested, and, also, in children, the pulsations are more extended; being perceptible over the third, or even three-fourths, of the inferior part of the sternum, and sometimes even over the whole of this bone; also at the superior part of the left side, as high as the clavicle, and sometimes, though feebly, under the right clavicle. When the pulsations are confined to the places above mentioned, in subjects of the kind noticed, and when they are much weaker below the clavicles than in the region of the heart, we may conclude that this organ is well proportioned.

When the pulsations of the heart become more extended, they are heard successively in the following places:—1. the whole left side of the chest, from the axilla to the stomach; 2. the right side over the same extent; 3. the posterior part of the left side of the chest; and, 4. the posterior part of the right side. This last is rare. In these cases the intensity of the sound is progressively less in the succession mentioned: for instance, it is less under the right clavicle than under the left: it is somewhat less on the lateral parts of the left side, than under the clavicle; it is still less perceptible on the right side laterally; and much attention is requisite to enable us to hear the pulsations at all on the back, particularly the right side. This succession has appeared to be constant, and may be taken as an index of the extent of pulsation. For instance, if this be perceptible on the right side, we may be assured that it will be equally so over the whole sternum, under both clavicles, and over the left side; but we are not sure that it will be so on the back. But if it be perceptible on the back on the right side, we may calculate on its being still more audible in every other part of the chest.

Several circumstances unconnected with the state of the heart may derange the order above mentioned, and augment the extent of the pulsations. I have already noticed the effect of emaciation and narrowness of chest. In young children, and in persons of all ages, whose bones are small and whose chest is narrow and little covered with flesh, the pulsations are heard over the whole thorax.* A hepatized lung, or one strongly compressed by an effusion in the chest, transmits the pulsations better than a healthy lung permeable to air. This result accords with the general principle of solid bodies being the best conductors of sound. But it has also appeared to me that the anfractuous excavations in the lungs, produced by the softening of tubercles, have constantly the same effect; a circumstance not so easily explained, unless we suppose that, in this case, the sound is transmitted, not through the cavities, but along their indurated and condensed boundaries. It is thus, that, in the case of tuberculous excavations in the summit of the right lung, we shall hear the pulsation of the heart better under the right clavicle and axilla, than on the left side, and sometimes even better than in the very region of the heart.* When the sound of respiration or the rhonchus is very great, the pulsation of the heart is sometimes perceptible on the sides and even on the back, although it is inaudible under the clavicles, being there completely masked by the other sounds.

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* In infancy the heart is proportionally larger than in adults; and its cavities larger in relation to the thickness of their walls.—*Author*.

It may be imagined that in our explorations we may confound the pulsation of the aorta and subclavian arteries with that of the heart. This mistake, however, is not possible, as will be shown more particularly afterwards. It is sufficient to know that under all circumstances the heart gives two distinct beats for every stroke of the pulse. Besides, I can state that out of the thousands of persons whom I have examined, in a state of health or disease, I have only met with three or four instances in which the subclavian arteries could be heard (except in the case of the *bellows-sound.*) And it is only in the case of aneurism, of the *bellows-sound*, or of *increased impulse*, that we can perceive the pulsation of the aorta and arteria inominata: and we recognize them also from their simple pulsations.

When the pulsation of the heart is heard over a greater extent than what is above stated to be the range of a well-proportioned organ, the individual rarely enjoys good health. In examining him attentively we shall discover indications of that cachexy peculiar to some diseases of the heart; and we shall find that if he has not formal dyspnœa, his respiration is, at least, shorter than usual, and he is put more easily out of breath, and is more subject to palpitation. This state, however, which is that of many asthmatics, may remain stationary many years, and does not always prevent the attainment of an advanced age. With regard to the relation between the state of the heart and the extent of its pulsations, I think it may be taken as a general fact, that the extent of pulsation is in the direct ratio of the thinness and weakness of the heart, and, consequently, inversely as its thickness and strength. The size of the organ must also be considered as favouring extent of pulsation, except in the case when the augmentation of size depends entirely on thickening of the walls of the ventricles.

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* It has appeared to me generally true, that tuberculous excavations and pneumothorax transmit the sound of the heart rather than its impulse; while hepatisation of the lung and compression from effusion, occasion results the reverse of these.—Author.

The above results are derived from the whole of the dissections made by me during the last ten years; as I have not met with a single fact calculated to throw any doubt on their accuracy. Thus, if the pulsations extend over almost all the places above mentioned, we may presume that the heart is increased beyond the natural size, and that this increase is owing to the dilatation of one or both ventricles. This presumption will be strengthened, if the pulsations are as great (or greater) under the clavicles or in the axilla, as in the region of the heart. The consideration of other signs to be hereafter mentioned, will render our diagnosis more certain, and point out more precisely the site, the extent, and the nature of the organic disease. I am far from wishing to assert that we ought to form our judgment from one sign. I wish to give to each its true value; and think it hardly necessary to state, that their value is greatly enhanced when they co-exist. Besides, when we come to treat of the peculiar signs of each particular disease, we shall be able to correct what may appear in this analysis to be stated in a manner too absolute.

If the pulsations are perceived neither in the back nor right side, but only in the other points mentioned, and if their intensity is nearly equal in all these, we may conclude that the ventricles are moderately dilated, and that the walls of the heart are naturally thin. On the contrary, when the pulsations are felt very strong in the region of the heart, and are not perceived at all or only very slightly under the clavicle, we may be assured (if the patient has other general symptoms of diseased heart) that the disease is hypertrophy of the ventricles. The special signs will point out which ventricle is affected. If the patient has never experienced any marked disorder of the circulatory organs, we may be certain that the walls of the left ventricle are both firm and thick, though still not sufficiently so to constitute disease. Generally speaking, then, it may be taken for granted that a great extent of sound is a mark of thin parietes of the heart, more particularly of the ventricles; and that a confined range of sound coincides with an increased thickness of these. Some accidental causes may augment for a time the extent of the heart's pulsation, such as nervous agitation, fever, palpitation, hæmoptysis, and, in general, whatever increases the frequency of the pulse.

This mode of appreciating the extent of the heart's pulsations by the number and site of the places in which they can be perceived, appears to be of great certainty and practical utility: the gradation just mentioned is constant, with the exceptions formerly noticed. Once or twice only have I had occasion to hear the pulsations more distinctly on the left back than on the right side anteriorly, in cases wherein I could not attribute the anomaly to the probable presence of pulmonary excavations: and the rareness of this fact ought, in my opinion, to cause it to be regarded as an exception occasioned by some analogous circumstances,—perhaps by a variety in the capacity or position of the great bronchial trunks. In certain cases, in which the sound of the auricles is little perceptible in the cardiac region, it is usually heard better a little higher up, or even under the clavicles; and sometimes even on the back.

In examining the extent of pulsation, the stethoscope has a decided advantage over the naked ear, which cannot be applied to the axilla, nor beneath the clavicles, nor between the scapulæ in very lean subjects.

CHAPTER II.

OF THE SHOCK OR IMPULSE COMMUNICATED TO THE EAR BY THE ACTION OF THE HEART.

I UNDERSTAND by shock or impulse, the sensation of upward pressure or percussion communicated to the ear of the auscultator by the action of the heart. This pressure is perceived by means of the stethoscope in the cases where the hand applied to the region of the heart communicates no sensation: and, on the contrary, the impulse appears very great to the hand, in lean subjects, and particularly during flurry, when the stethoscope proves the real impulse to be small.

We must be careful not to confound with the impulse of the heart, the rise of the thoracic parieties during inspiration. This caution is more particularly necessary when the respiration is very short and frequent, and is performed with great labour, as in the agony of most diseases, and in paroxysms of dyspnœa. The degree of impulse communicated by the stethoscope to the ear, is, in general, inversely as the extent of the pulsation of the heart, and directly as the thickness of the walls of the ventricles. In a person whose organs of circulation are well-proportioned, this impulse is very little perceptible, often quite imperceptible, especially if the individual is rather fat. Quick walking or running, or the act of ascending a height, nervous flurry, palpitation, and fever, commonly augment the impulse in subjects the walls of whose hearts are rather thick, and still more when they are so much so as to constitute actual hypertrophy. In this case, the impulse is usually so great as very sensibly to elevate the head of the observer, and sometimes to give a disagreeable shock to the ear. The more intense the hypertrophy, the longer time the impulse is perceptible. When the disease exists in a high degree, we feel as if the heart, in dilating, first comes in contact with the walls of the chest in one point only, and then with its whole surface, and that it contracts and falls back all at once. When the heart is thin, the same causes produce a different result, as we shall see hereafter.

The impulse of the heart is only felt during the systole of the ventricles; or if, in some rare cases, an analogous phenomenon accompanies the contraction of the auricles, this is easily distinguished from the former. In fact, when the systole of the auricles is attended by any sensible action, this is perceived to have its seat much deeper; and the heart even seems to be receding from the ear. Most commonly the motion consists merely of a sort of trembling, felt deep within the mediastinum. In any case, it is very little marked as compared with the sensation produced by the contraction of the ventricles, when these are of a good degree of thickness. When the walls of the heart are thinner than usual, no impulse is communicated, even when the pulsation is the greatest: and, in this case, the alternate contraction of its cavities is only distinguished by the sound these produce. A strong impulse, therefore, must be regarded as the chief sign of hypertrophy; and the absence of all impulse, (conjointly with other general and local signs,) as characteristic of dilatation of the heart. This result appears to me quite constant; at least I have not hitherto met with one exception to it; and it is now supported by a very considerable number of facts. Since the beginning of my researches on auscultation, I have made a point of ascertaining the character of the heart's pulsations in all my hospital patients, and in no case has examination after death invalidated the rule above laid down.

The impulse of the heart's action is usually perceptible only over the region of the heart, or, at most, over the inferior half of the sternum. When very great, it extends to the epigastrium in cases where the sternum is short. In simple hypertrophy it is usually perceived in no other part, even when the pulsations are heard in other points of the chest; but when this is conjoined with a certain degree of dilatation, it is sometimes distinctly perceived under the clavicles, and in the left side of the chest; and sometimes even on the back, in a slight degree.

There is one case in which we are able in some degree to distinguish the shock communicated to the walls of the chest, from that conveyed to the ear. This is the complex case of hypertrophy and dilatation of the ventricles, but with the latter affection more marked than the former. In cases of this kind the impulse is usually not great, except during the existence of palpitation; and it has a very different character from that produced by simple hypertrophy: the beat of the heart is hard, with a sound like that produced by the blow of a mallet; but the blow seems confined to a small space; it is expended on the walls of the chest, and does not communicate to the ear an elevation or upward pressure proportioned to its force: it differs from the impulse occasioned by a strong hypertrophy in this, that, in the latter case, the distended ventricles appear to come in contact, in their whole length, with the walls of the chest, which yield before their pressure; whilst, in the other case, the mere point of the heart seems to strike the thoracic parietes, with a sharp definite blow, which produces in these rather a vibration, than an actual elevation. The same result is observed, but in a less degree, in purely nervous palpitations.

Bloodletting, diarrhœa, severe and long continued abstinence, and, in general, every thing capable of weakening the system, diminish, in a marked degree, the impulse of the heart. For this reason, when we see a patient for the first time, in the course of a disease which has already produced a great diminution of strength, it may happen that the stethoscope shall not discover hypertrophy of the ventricles, if existing in only a middling degree. The heart's impulse, in like manner, frequently ceases altogether, even in cases where the hypertrophy is considerable, upon the supervention of very intense dyspnœa, in cases of pneumonia, pleurisy, œdema of the lungs, asthma, or in the congestions immediately preceding death. The clear sound which, as we shall see, accompanies dilatation of the heart, in like manner diminishes or entirely disappears under similar circumstances. We must not, therefore, deduce any conclusions from explorations made at such times.

CHAPTER III.

OF THE SOUND PRODUCED BY THE MOTIONS OF THE HEART.

The alternate contraction of the different parts of the heart produces a peculiar sound, of which the individual is himself sensible during palpitation and in nervous or febrile excitement: more especially if lying on the side, with the ear compressed against a cushion. This sound, however, is perceived by the patient only, except in one rare instance to be afterwards noticed. The application of the hand, in some cases, communicates sensations different from those of mere impulse, and suggests to us, rather than enables us actually to perceive, the existence of sound within the chest; but this confused perception cannot bear a comparison with that supplied by the stethoscope.

In ordinary circumstances, the stethoscope, applied between the cartilages of the fifth and sixth ribs, at the end of the sternum, or, indeed, in any point where the pulsations of the heart are perceptible, conveys to the ear a distinct sound; even in cases where the heart is very small and weak, and when the pulse is no longer to be perceived. This, in the healthy body, is double; and each beat of the arterial pulse corresponds to this double sound, in other words, to two sounds. One of these is clear and rapid, and somewhat resembles the sound produced by the valve of a pair of bellows: this corresponds to the systole of the auricles. The other is more dull and prolonged, coinciding with the beat of the pulse, and with the shock or impulse communicated to the walls of the chest by the motion of the heart:—it indicates the contraction of the ventricles. The sounds heard at the end of the sternum are produced by the action of the right side of the heart; those between the cartilages of the ribs by the left cavities. In the state of health the sound produced by the contractions of each side is the same; in certain states of disease, on the contrary, the sound of the two sides becomes quite dissimilar.

The sound is the only phenomenon usually observable in any other part of the chest beside the cardiac region; the impulse of its action being confined, as already observed, to the space comprised between the cartilages of the fifth and sixth ribs, the end of the sternum, or (in some cases) the epigastrium. The sound produced by the action of the heart is great in proportion as the walls of the ventricles are thin and their impulse feeble: consequently, it cannot be attributed to the percussion of this organ against the side.[*] In a moderate degree of hypertrophy, the contraction of the ventricles yields only a dull sound, like the murmur of inspiration, and the auricle, in like manner, much less sound than in the natural state. In a high degree of hypertrophy, the contraction of the ventricles produces merely a shock without any sound, and the sound of the auricles becomes very dull and is scarcely audible. On the other hand, when the ventricular parietes are thin, the sound produced by their contraction is clear and loud, approaching to that of the auricles; and if there be a marked dilatation of the ventricles, the sound becomes nearly similar, and almost as strong as that of the auricles. In the case of considerable dilatation, the two sounds can be distinguished, neither by their character nor their degree, but solely by their isochronism or anachronism with the arterial pulse. In a state of health the sound of the contractions of the heart is nowhere heard so strongly as in the cardiac region; and it becomes feebler in the other points of the chest according to the progression formerly mentioned. But in certain cases of disease it may be heard more distinctly in other places. In dilatation of the ventricles the sound of the heart's contractions is commonly as loud under the clavicles as in the cardiac region.

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[*] It will be seen hereafter that one of the most distinguished physiologists of the age, M. Majendie, nevertheless, still adheres to this most ancient and popular explanation of the phenomenon.—*Transl.*

In certain healthy subjects, in whom the walls of the heart are somewhat thinner than common, the sound of the contraction of the auricles is sometimes much louder than that of the ventricles below the clavicles, although the same disproportion is not observed in the cardiac region. In cases of hypertrophy, also, it frequently happens that while, in the cardiac region, we are sensible only of a strong impulse with hardly any sound, even of the auricles, the latter is perceptible (and this only) under the clavicles, and even on the back. Indeed, even in slighter cases of hypertrophy, the sound of the auricles is always more distinct in these places than in the region of the heart, particularly in lean and narrow-chested subjects. In certain cases both the sounds, although sufficiently distinct, become extremely dull in the region of the heart. Sometimes this dulness depends on the natural prolongation of the lungs and pleura, over and before the heart. In this case, the sound of the respiration sometimes prevents us from distinguishing clearly the sound of the heart; and the contraction of the ventricles, in pressing out the air from the portion of lung situated between them and the sternum, always produces a particular sound, which will be noticed below, and which occasionally altogether masks the natural sound.

It may be well to remark in this place, that the disposition of lung just mentioned, and which is by no means uncommon, may sometimes render null one of the signs considered as indicating enlargement of the heart,—I mean the dead sound on percussion. In such cases, the cardiac region will yield a good sound, although the heart may be double the natural size: this is chiefly observed in the instance of pulmonary emphysema complicated with diseased heart,—a complication not very unusual. Softening of the substance of the heart, an affection which, although very frequent, has hitherto been little attended to by practitioners, appears also to render the sound of the heart much duller than natural. And lastly, the obstruction of the natural flow of blood through the heart, whether produced by too much blood, or by disease of the lungs, not only diminishes but modifies the sound. Other and very remarkable modifications of sound presented by the heart in its different pathological states, will be noticed in a subsequent chapter.

CHAPTER IV.

OF THE RYTHM OF THE PULSATIONS OF THE HEART.

By *rythm* I understand the order of the contractions of different parts of the heart, and their relative duration and succession, detected by the stethoscope. I shall describe in order the different sounds produced by a heart in a perfectly healthy state, and in the best proportions for executing its functions with freedom and integrity. It is not possible to state these proportions with geometrical accuracy; but I am led by the result of all my dissections since the year 1801. to fix them as follows:—The heart, including the auricles, ought to be of a size equal to the closed hand of the subject, or only a little less or greater than it. The walls of the left ventricle ought to be of a thickness somewhat more than double that of the right. The texture of the left ventricle, firmer and more compact than that of the muscles, ought to keep it from collapsing when laid open. The right ventricle ought to be a little larger than the left, with columnæ carnæ of greater size, and ought to collapse on being cut into.

In a heart so proportioned, the alternate contractions of the ventricles and auricles, as examined by the stethoscope, and the pulse as examined by the finger, afford the following results:—At the moment of the arterial pulse, the ear is slightly elevated by an isochronous motion of the heart, which is accompanied by a somewhat dull, though distinct sound. This is the contraction of the ventricles. Immediately after, and without any interval, a louder sound resembling that of a valve, or a whip, or the lapping of a dog, announces the contraction of the auricles. (I make use of these trivial expressions because they appear to me to convey better than any description, an idea of the nature of the sound in question.) This sound is accompanied by no motion perceptible by the ear, and is separated by no interval of repose from the duller sound and motion indicative of the contraction of the ventricles, which it seems, as it were, to terminate and interrupt abruptly. The duration of this sound, and consequently the period of contraction of the auricles, is less than that of the ventricles—an incontestible fact of which Haller entertained doubts. Immediately after the systole of the auricles, there is a very short, yet well-marked interval of repose, subsequently to which we feel the ventricles swell anew, with the dull sound and gradual progression which characterize their action; then follows the quick and sonorous contraction of the auricles, and again the renewed but momentary quiescence of the heart. This state of quietude after the contraction of the auricles does not appear to have been known to Haller as a natural condition.* The relative duration of the contractions of the auricles and ventricles, appears to me to be as follows:—a third (at most) or a fourth is occupied by the systole of the auricles; a fourth, or a little less, by the state of quiescence, and the half, or nearly so, by the systole of the ventricles.

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* This explanation of the progressive movements or *rythm* of the heart is, as stated in a former note, at variance with the observations and opinions of nearly all preceding and succeeding physiologists, and cannot be entertained in the present state of our knowledge. The precedence of the auricular to the ventricular contraction, long since observed by Harvey and Haller, has been satisfactorily established by the recent experiments of Dr. Hope: and I would give the following statement, from the article *Auscultation* in the Cyclopædia, as an accurate representation of the phenomena, in opposition to that in the text:—The first motion of the heart which interrupts the interval of repose, is the auricular systole. It is a very slight and brief contractile

These remarks may seem minute; but I am assured they will be found exact and easily verified by any one who will attend to the action of the heart, in a healthy subject, for only a few minutes; and such trial will be made with most advantage when the pulse is slow. When the pulse is at the same time slow and infrequent, the contraction of the ventricles is prolonged, the sound duller, and the shock less: the systole of the auricles, however, still retains its wonted brevity and sound,—or even appears shorter than usual, on account of the lengthened systole of the ventricles. In this case, the interval of repose after the contraction of the auricle is not sensibly shorter. The period of quiescence after the contraction of the auricle, is not sensibly less. When, however, the pulse is infrequent and at the same time quick, the interval of repose is then longer and more marked than usual. In the case of a person labouring under apoplexy, whose pulse, though quick, was only fifty-eight in a minute, I found it equal to the period of the systole of the ventricles; and in another, with symptoms of the same disease impending, with a pulse also quick and only forty in the minute, the period of quiescence was equal to that of the systole of both the auricle and ventricle.

From the foregoing observations it appears that the heart, far from being in a state of constant action, as is usually supposed, has its alternations of action and repose, the sum of which does not differ from those of many other muscles, more especially the diaphragm and intercostal muscles. From the proportions above stated it follows, that in twenty-four hours the ventricles have twelve and the auricles eighteen hours of quiescence. In persons whose pulse is habitually below fifty, the repose of the ventricles

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[illegible] more considerable in the auricular appendix than elsewhere, and propagated with a rapid vermicular motion towards the ventricle, in the systole of which it is continued rather by continuity of action than by the succession of a new movement. The ventricular systole commences suddenly, and is accompanied with a considerable diminution of the volume of the organ. Synchronous with the systole are the first sound, the impulse of the apex against the ribs, and the pulse in vessels near the heart; in the radials the pulse follows at a barely appreciable interval. The systole of the ventricles is followed by their diastole, during which they return, by an instantaneous [illegible] movement sensible to the touch and sight, to the same state (with respect to size, shape, position, &c.) as during the previous interval of repose. This movement, or diastole, is accompanied by the second sound, by an influx of blood into the auricle, by a vermicular motion of this cavity most observable at its sinus, and by a slight removal of the apex of the heart from the walls of the chest. Next succeeds the interval of repose, during which the ventricles remain at rest, in a state of fulness, though not of distension, through the whole period intervening between the second and the first sounds; but the auricle remains at rest during the first portion only of that period, the remainder being occupied by its next contraction, with which recommences the series of actions described.—*Transl.*

is more than sixteen hours in the four-and-twenty. Even the muscles of voluntary motion have often not more rest than this, in persons subject to bodily labour; and some of the muscles which keep the head and trunk erect have even less, especially such as have not their action completely interrupted by sleep.* The preceding calculation is equally exact, whether we suppose the dilatation of the heart to be passive, or consider it, as I am disposed to do, with Pechlin, as active: on the latter hypothesis, we cannot suppose that the same muscular fibres produce both the dilatation and contraction of the cavities.

The isochronism of the ventricular contraction and the arterial pulse, is best perceived when the pulse is slow.† Indeed, when the pulse is at all more frequent than natural, (say about 72,) it is not easy to distinguish this isochronism. In this case, also, the interval of repose after the contraction of the auricles, is not distinguishable; the period of the contraction of the ventricles, but not of the auricles, is shortened; while there is commonly diminution of the impulse, but increase of the sound, attending the systole of the ventricles. It results from these observations and others in a preceding page, that when the contraction of the ventricles becomes slower than usual, this prolongation of their action, is, in general, taken neither from the period of the auricular contraction nor from the period of repose, but is a direct addition to the time occupied by the contractions of the heart: hence the pulse becomes always slower in such cases.

Hypertrophy of the ventricles, when in a moderate degree, presents, in some respects, an exaggeration of the natural rythm of the heart's actions. The contraction of the ventricles becomes less noisy, and more readily distinguishable from that of the auricles. After the latter, the interval of quiescence is well marked, and contrasts very sensibly with the sound that precedes, and the motion which follows it. But in hypertrophy carried to a very high degree, the rythm of the heart is singularly changed. In this case, the contraction of the ventricles is greatly prolonged. This at first is perceived as a profound and obscure motion, which gradually augments, elevates the applied ear, and then terminates in producing the impulse or shock. This contraction is unaccompanied by any sound, or, if this exists, it is merely a sort of murmur like that of respiration. The contraction of the auricles is extremely short, and almost, or altogether, without sound: and in some cases the systole of the ventricles seems scarcely over before they begin to swell afresh. The interval of repose no longer exists, or is confounded with the almost imperceptible commencement of the contraction of the ventricles. In extreme cases, there is no sound distinguishable but the murmur above mentioned, and we merely recognize an elevation of the heart corresponding to each beat of the pulse.

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* It ought to be remarked, on the other hand, that the muscles subject to the influence of the will, as those of the limbs, and which are liable to great temporary increase of action, enjoy the longest repose. Thus, in a person that has walked twelve hours out of the twenty-four, the muscles of the legs and thighs will have, in reality, only acted during six, inasmuch as the extensors and flexors act alternately; but the muscles of the trunk will have been, during the whole journey, in a state of almost continued contraction, although in a much less degree and in some sort automatic. From this it may be concluded that, in the case of a person in health, who takes a degree of exercise proportioned to his strength, the sum of action is nearly equal in every order of muscles, including the heart. And from the same facts we may deduce this further conclusion, which is moreover in accordance with experience, that those occupations which, like that of the labourer, lead to a nearly equal exercise of the different parts of the muscular system, are the most conducive to health.—*Author.*

† The isochronism of the ventricular systole and the arterial pulse, only exists in vessels near the heart: in the arteries of the extremities the beat of the pulse succeeds the beat of the heart after a well-marked interval; and the length of this interval progressively decreases in the vessels as we approach the heart, showing that the impulse communicated to the column of blood in the arterial tree is strictly progressive.—*Transl.*

In these cases the increased brevity of the auricular contraction, or its apparent absence, is not the consequence of their diminished contractibility merely, but, also, of their contraction commencing before that of the ventricles has entirely ceased. This becomes particularly evident in certain cases in which the auricles are found to contract very forcibly and in a convulsive manner, with a loud sound, apparently anticipating the contraction of the ventricles and interrupting it in its mid-course. This kind of anticipation, which is frequently observed in the case of palpitation, produces an effect very difficult to be described, though easily recognized when it has been once heard: it is a sort of subsultus like what would be produced by a spring placed under the heart, which, on being let go, should suddenly strike this organ, and stop its motion. It seems, in short, as if the movement in question did not proceed from the heart itself, but from a contractile organ, of greater power, placed beneath it. This convulsive contraction is sometimes double, that is, we perceive two successive contractions without any interval; but immediately after, the heart regains its usual rythm.

When the walls of the left ventricle are naturally thin, or have become so from dilatation, even in a slight degree, the rythm of the heart's actions is quite different. In this case, the interval of repose after the contraction of the auricle is no longer perceptible. The contraction of the ventricles is more sonorous, more resembling that of the auricles, and more approaching the latter in duration. From these circumstances it necessarily follows that, in such subjects, the pulse must be habitually frequent, and the synchronism of the systole of the ventricles and the diastole of the arteries, of more difficult recognition. Such persons are, therefore, very unfit subjects on which to study the mechanism of the heart's action; and ought not to be explored by the young auscultator, until after he has acquired the knowledge of the natural rythm on individuals more favourably constituted.

To the phenomena enumerated are conjoined, as already mentioned, a lesser impulse, and a more extensive range of the sound of the heart's pulsation. Together, these signs uniformly indicate a heart disposed to dilatation,—that is to say, (to assume a standard of comparison in a case where there cannot be a fixed standard) a heart in which the walls of the left ventricles have, at most, a thickness double that of the right. This condition of the organ of circulation is congenial in many cases. It does not necessarily abridge life, but is usually conjoined with a delicate constitution, a small stature and puny muscles. Persons so constituted are narrow chested, and have the respiration habitually short. In the case of fever and disease of the organs of respiration, they experience, *ceteris paribus*, a greater dyspnœa than other persons. Should the condition in question increase only in a slight degree, a dilatation of the heart is the necessary consequence.

When dilatation actually exists, it produces merely an increase of all the characters which indicate a heart with thin parietes. The contraction of the ventricles becomes as short and noisy as that of the auricles; the pulse, consequently, becomes very frequent: and the isochronism of the arterial pulse and the contraction of the ventricles become quite undistinguishable. It even sometimes appears, by the reverse of the natural order, as if the arterial pulse coincided with the contraction of the auricles. This result frequently depends on a mere illusion of hearing, occasioned by the frequency of the heart's contractions; but there certainly are some subjects, in whom, even in the state of health, the contraction of the ventricles and the beat of the pulse do not perfectly accord,—the diastole of the artery being always a little later. To these signs we must add—the absence of any sensible impulse; the extension of the heart's pulsation over the whole or greater part of the chest; and sometimes the existence of this in as great force under the clavicles and the axilla as in the region of the heart itself. This last character, in particular, may be regarded as pathognomonic, if the patient is not phthisical and pectoriloquous in the places mentioned; and, like all the others mentioned, it is more marked in proportion as the dilatation is more extensive.

Such are the phenomena presented by the regular rythm of the heart, as well in a sound state of the organ, as when its walls are either thicker or thinner than natural. But in many circumstances, which do not at all amount to disease or even serious indisposition, this rythm exhibits various anomalies. These are commonly classed under three principal heads—*palpitations*, *irregularities* and *intermissions*; and I shall notice them, in order, after having given an account of certain anomalies in the sound of the heart.—In the whole of the present chapter I have supposed the heart to be either quite sound, or affected similarly and equally in both sides; but when only one of the sides of the heart is affected, and more particularly in the case of contraction of the orifices, the rythm, the sound, and the impulse of the sides may differ so much as to occasion results that might be attributed to two different hearts.

As in the preceding discussion I have constantly used the expression of *contraction of the auricles*, I think it necessary to remark that I do not by this intend to prejudge the question lately agitated by my friend, Dr. Barry, a distinguished physician of the English army. This gentleman has endeavoured to prove, by direct experiment, that atmospheric pressure is the chief cause of the circulation in the veins.* He remarks, in the first place, that the dilatation of the chest in inspiration, produces a tendency to a vacuum in the whole thoracic cavity; that the walls of the pericardium and heart follow the motion of the chest: that, consequently, at the very time the air rushes into the bronchi, the blood is rapidly sucked up by the right auricle, and is precipitated into the left auricle, as well from the same cause as from the pressure exerted on the pulmonary vessels. The chief experiments on which Dr. Barry founds his doctrines, are the following: 1. if we introduce into the internal jugular vein of a horse, a bent glass tube, and place the other extremity of it in a vessel containing a coloured fluid, we find this drawn into the vein at each inspiration, until it is all exhausted; 2. the same experiment made by adapting the glass tube to a metallic one introduced into the pericardium gives precisely the same results; 3. having laid open the abdomen of a horse, and separated the vena cava, if we lay hold of the latter, we find the vein become emptier and flaccid during each inspiration. Having myself witnessed several of Dr. Barry's experiments, I am convinced of the correctness of his opinion respecting the influence of atmospheric pressure on the circulation in the veins; and I consider his discovery as the most remarkable addition that has been made to that of his illustrious countryman, Harvey. Wherefore, if we admit, as I think we must, the truth of Dr. Barry's proposition, we must at the same time admit, with him, that the auricles are merely reservoirs which are constantly full, and on which the ventricles draw at each diastole; so that what I have termed *contraction of the auricles*, must be understood only of their sinuses or appendixes. If this were not the case, and the auricle contracted completely, inspiration ought continually to derange the regularity of the heart's action,—which is not the fact. I agree with Dr. B. that the auricles habitually contain much more blood than the ventricles draw off at each diastole, and that the sinus contracts with much greater force than the auricle itself; at the same time, I by no means consider the latter as entirely passive; on the contrary, I think it is proved by the inspection of the heart in a living animal, that the whole of the auricle does contract, but that the contraction is much stronger and more evident in the sinus. If inspiration does not occasion any habitual alteration in the rythm of the heart's actions, this arises, no doubt, on account of the eminently elastic and extensile texture of the auricle, whereby it is enabled still to be in a state of considerable distension at the very time at which the contractile movement takes place, if its contraction coincides with the motion of inspiration.—If we compare the experiments of Dr. Barry with the observations of Pechlin on the active dilatation of the heart of vigorous animals, at the moment of separation from the body, (which he states to be sufficient to press open the compressing hand) the mechanism of the circulation in the veins seems easily understood. The blood flows copiously into the auricles at each inspiration, and the ventricles draw on these reservoirs at each diastole: the contraction of the auricles is a necessary consequence of the dilatation of the ventricle: it is contemporaneous with the ventricular diastole, and is requisite to prevent a vacuum. Many phenomena, as Dr. Barry observes, are explained by the mechanism just described, and, among others, the descent of the brain during inspiration, and its rise, or rather dilatation, during expiration; the reflux of blood into the jugular veins from coughing or a prolonged expiration; and the sudden death occasioned by the introduction of air into the internal jugular vein, a case which has occurred two or three times within these few years, during surgical operations.*

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* Recherches expérimentales sur la cause du mouvement du Sang, &c. par Dr. Barry, M. D. &c. *Paris*, 1825.—Dr. Barry has since published his work in English under the title of "Experimental Researches on the Influence exercised by Atmospheric Pressure," &c. *Lond*. 1826. This work is highly deserving the attention of physiologists and practitioners.—*Transl.*

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* In attempting to lay before the reader the various opinions promulgated by numerous writers on the subject of the *motions and sounds of the heart*, I gladly avail myself of my friend Dr. Williams's permission to introduce the chief part of the condensed and accurate outline of the subject given in the appendix to the second edition of his excellent work on Auscultation, entitled *A Rational Exposition of the Physical Signs of the Diseases of the Lungs, &c.* Lond. 1833. And while I accord with him as to the inadequacy of any one of the numerous theories fully to explain the phenomena, he will, I know, forgive me for classing his own explanation of the causes of the sounds, in the same category. It is fortunate, in a practical point of view, that, whatever be the rationale of the phenomena, the facts, now I think established, of the *first sound being* COINCIDENT *with the systole*, and the *second sound with the diastole* of the ventricles, suffices for our guidance, in regard to diagnosis, in the great majority of cases. I now transcribe Dr. Williams's critical outline:

On the Motions and Sounds of the Heart.—It is of considerable utility in the examination of a controverted point, to review fairly the various opinions respecting it, and by collating them with available facts, to determine the comparative probability of these views: if this had been done with regard to the present subject, much useless speculation might have been saved, and some animal life spared; for any attentive reader of the periodical medical literature, must have perceived that the same opinions have been broached, refuted, and revived by successive writers, and the same experiments performed and reiterated in apparent ignorance of preceding inquiries.

On this account, I am induced to give a summary sketch of the leading features in the views which have been advanced respecting the motions and sounds of the heart, and bring them successively to the test of some well-established pathological or physiological facts. Others, besides the names quoted, may have supported the views in question, but it is only the views which I wish to deal with, and I cite the writers with a wish to show that the arguments which each has advanced have been carefully studied.

1. M. Laennec. *a*. 1st sound, impulse, and pulse, caused by the ventricular systole. *b*. 2nd sound by the systole of the auricles.—*Remarks*. *a* Generally admitted and proved by various facts and experiments. *b*. Disproved by the fact stated by Harvey and Haller, and confirmed by modern experiments, that the auricular contraction immediately precedes that of the ventricles; also by this fact, that the sounds sometimes continue after the auricles have ceased to contract. (Dr. Hope's Experiments on Asses. See his work, p. 36.) [And yet more completely disproved by the fact, that for the production of the two sounds the division of the heart into auricle and ventricle is not necessary. See Dr. Stokes's paper on Aneurism in the Dublin Journal. J. F.]

2. Mr. Turner. (Med Chir. Trans. Edin. vol. iii.) 2nd sound produced by the falling back of the heart on the pericardium after the systole of the ventricles.—*Remark*. Disproved by the fact, that the sound continues when the heart is placed out of the pericardium.

3. Dr. Corrigan. (Trans. of King's and Queen's Coll. of Phys. Ireland.) *a*. The pulse and 1st sound caused by the rush of blood into the ventricles during the auricular systole. *b*. 2nd sound by the ventricular systole, which he considers to be instantaneous.—*Remarks*. *a*. Disproved by the clearly ascertained facts, that the 1st sound and impulse accompany the systole of the ventricles when the auricles have ceased to contract. *b*. Disproved clearly in large animals by the ventricular systole, (which is not instantaneous,) and the pulse of arteries near the heart evidently preceding the 2d sound; (Dr. Hope's Experiments, p. 31, of his work; and those of Mr. Carlile, Dublin Journal of Medic. Sci. vol. iv.) and further disproved by several pathological phenomena.

4. Dr. David Williams. (Edin. Med. & Surg. Journ. Oct. 1829.) 2nd sound caused by the flapping open of the auriculo-ventricular valves against the sides of the ventricles; these valves he supposes to be opened by the musculi papillares.—*Remark*. This is contrary to the received opinion of anatomists with respect to the functions of the auricular valves and musculi papillares, and there is no solid argument to maintain so gratuitous an assumption.

5. M. Pigeaux. (Arch. Générales de Médecine, Juillet et Novembre, [illegible]) *a*. 1st sound produced by the blood rushing into the ventricles at the moment of their diastole. *b*. 2nd sound by the collision of the blood against the walls of the aorta and pulmonary artery. *c*. The ventricles contract in a moment of silence before the 2nd sound. *d*. The intensity of the sounds proportioned to the force by which the blood is impelled.—*Remarks*. *a*. Opposed by the facts stated against 3 *a*; opposed also by many pathological facts, such as the occurrence of a murmur with the first sound in case of diseased semi-lunar valves. *b*. Disproved by the fact that the 2nd sound occurs distinctly *after* the pulse in the carotids, and therefore after that of the larger arteries. *c*. Opposed by the observation, that the 1st sound and ventricular systole occur together and correspond in duration. *d*. This is opposed by the phenomena of dilatation of the ventricles, which always increases the first sound, and of hypertrophy, which diminishes both sounds.

6. M. Majendie. (In a Lecture read at the College of France, quoted by M. Pigeaux.) 1st sound and impulse produced by the ventricular diastole impelling the apex; the 2nd sound by the systole impelling the base of the heart against the walls of the chest. *Remark*. Disproved by the fact opposed to 2.

7. M. Rouanet. (Journ. Hebdom, No. 97; also Mr. Bryan, Lancet, Sept. [illegible]) *a*. 1st sound caused by the closing of the mitral and the tricuspid valves against the auriculo-ventricular orifices during the ventricular systole. *b*. 2nd sound by the reaction of the blood in the arteries on the semilunar valves at the moment of the ventricular diastole.

8. Mr. H. Carlile. (Dublin Journal of Medical Science, vol. iv. The same was likewise read at the Cambridge Meeting of the British Association.) *a*. 1st

produced by the rush of blood into the arteries during the ventricular systole. *b* 2nd sound by the reaction on the semilunar valves as stated in *b*. 7.

9. Dr. Hope. *a*. 1st sound and impulse, caused by the ventricular systole; *b*. 2nd sound and *back stroke*, or 2nd impulse, by the ventricular diastole. The natural as well as morbid sounds produced by the motions of the contained fluid.

Before we sift the questionable points in these three last views, it will be proper to review the principal grounds on which we adopt their description of the sounds and motions, in defiance of many preceding authorities. Having been present at some of Dr. Hope's experiments on the ass, I had ample opportunity of convincing myself that the sounds were connected with the motions of the ventricles only. When the pericardium was laid open, and the large heart exposed, vigorously pulsating; the eye watching it, the hand grasping it, and the stethoscope applied to it, gave perfectly corresponding impressions, insomuch that on substituting touch for hearing, it was difficult to banish the impression that one still *heard* the double sound which was so exactly represented in quality and duration by the motions of the ventricles, as felt and seen; and on combining touch and hearing, by applying the hand and the stethoscope at the same time, these impressions, which corresponded in nature and duration, were found also to be perfectly simultaneous. The apex of the heart was observed and felt to strike against the ribs at each systole, and thus was explained the impulse. The motions of the auricles, when regular, preceded the ventricular motions and sounds; they were slight and undulatory, increasing from the sinus to the appendix, where they terminated suddenly, and were immediately followed by the ventricular systole. They afterwards became irregular, sometimes failing and sometimes occurring twice slightly during the period of ventricular repose, and in one experiment entirely ceased some minutes before the movements and sounds of the ventricles. In no instance were they attended with any perceptible sound. This account is confirmed by the experiments of Mr. Carlile, which satisfactorily explain the succession of the motions of the auricles and ventricles; but they were performed on animals too small to illustrate the sounds. He very justly shows that the pulse cannot be simultaneous in all the arteries at once, but must be successive, transmitted in a wave from the heart to the end of these elastic tubes.

Although it seems fairly established that the first, or dull sound, is produced by the systole of the ventricles; and the second, or quick one, by their diastole, it is by no means clearly explained in what way these actions generate these sounds. The following causes have been severally assigned as physically capable of generating the first sounds during the systole of the ventricles. 1. The collision of the particles of fluid in the ventricles. (Dr. Hope.)—2. The rush of blood into the great arteries. (Mr. Carlile.)—3. The closing of the mitral and tricuspid valves. (M. Rouanet, Mr. Bryan.)—4. The muscular contraction itself.

1. The first of these explanations is ingeniously proposed by Dr. Hope, but he advances no facts in direct proof of the hypothesis. In a number of experiments which I have made on the generation of sound, I have found liquids, of all bodies, the most difficult to excite to sonorous vibration; and although they readily transmit vibrations already produced in solids, it requires a combination of circumstances to make them originate sound. This is consistent with the explanation given of the production of sound, for impulses which throw solids into sonorous vibration, are expended in liquids in causing a displacement of their particles. On making an experiment with a gum elastic bottle, by filling it with water, and then forcibly compressing it under water by the end of the stethoscope, (avoiding the use of the hand, for that produces its own muscular sound,) I have failed in procuring any sound at all approaching to that of the heart's contraction. The blood yields readily to the contracting ventricle, and there being no obstacle to the escape of blood from it, further than the weight of the arterial column, which the normal action of the heart can quietly and steadily overcome, it passes into the arteries without vibration. But if there be an obstacle to the current of the blood from the ventricle, whether that obstacle be a narrowing or a projection in the orifice, the current will act on it just as the bow does on the string of a violin; a sound will be excited, and thus are produced valvular murmurs. Again, if instead of the orifices being narrowed, the heart contracts with unnatural briskness, expelling its contents with convulsive energy, the natural outlets then become relatively narrow, and are thrown into vibrations: this is the *rationale* of the bellows murmur which accompanies the jerking pulse of pericarditis and the irritation of inanition. But the difference of these sounds, and of the circumstances that excite them, from those of the

normal action of the heart, makes me hesitate to refer the latter to the same principle; and the fact that the morbid are often superadded to the natural sounds, also inclines me to think that they have a distinct cause.

2. The second explanation of the first sound, the rush of blood into the large arteries, is perhaps less liable to the acoustic objection before urged than the preceding opinion, for the blood has acquired an impulse when it enters the arteries, and if its course there is not free, it might readily produce a sound. But in their natural state, the arteries give passage to the blood as smoothly as the heart parts with it; and it would prove an imperfection in nature were it otherwise. Moreover, if this explanation were true, the large arteries rather than the heart would be the principal seat of the sound; and the sound should be increased by an hypertrophied heart, with a strong pulse, and diminished by a dilated heart and a weak pulse: yet the reverse of these is presented in nature.

3. The closing of the auricular valves. The principal objection to this as the sole cause of the first sound, is, that it must be instantaneous, and confined to the first part of the ventricular systole, whereas we know that the first sound is prolonged during the whole period of this action.

4. Although Laennec referred the first sound to the systole of the ventricles, he did not attempt to define the physical cause of its production. I have ventured to class it among the muscular sounds which Dr. Wollaston first noticed to occur in all cases of rapid muscular contraction. This sound may be exemplified by applying the fleshy part of the thumb to the stethoscope or naked ear, and bending and straightening the thumb. It is louder in muscles that are thin, and in a state of considerable tension; and it is remarkable that it does not cease with the apparent movement, but continues as long as the muscle remains contracted and tense: it then takes on an intermitting character like the noise of the rolling of a carriage on rough pavement, whence Dr. Wollaston was led to infer that muscular action is not perfectly continued, but consists of a series of minute contractions and relaxations. A good example of it may be obtained on applying the stethoscope to the neck of a person who holds his head back towards the opposite side, and then throws the platysma myoides into contraction. It still appears to me, that the most simple and satisfactory way of accounting for the first or systolic sound of the heart, is to refer it to this class of sounds. Their physical production seems to depend on the tension into which the fibres of muscles are thrown when they contract; and the self-acting power of these fibres constitutes them the motors as well as the subjects of sonorous vibrations. Here we have to remark the extreme facility with which the motions of solids produce sounds, compared with those of fluids: for it is almost impossible to touch, stretch, bend, or compress solids, without throwing them into sonorous vibrations. The varieties observed in the contraction of the heart seem to me to be perfectly explicable on this principle. The sound begins the moment the fibres are at a state of tension; it continues until the contraction is completed and the blood expelled from the ventricle, and ceases the instant of the diastole. M. Pigeaux is in error when he maintains that muscular sounds cannot be produced under water; I find them more distinct and free from adventitious sounds of the surface, and I have been able to imitate the sounds of the heart very exactly by muscular movements of the hand under water.

We now come to the subject of the second sound, which, although certainly occurring at the moment of the diastole of the ventricles, has received several different explanations as to its physical cause. The only two which appear tenable in the present state of our knowledge are—1. the reaction of the arterial columns of blood against the semilunar valves. 2. The impulse of the blood from the auricles filling the ventricle at its diastole.

1. The first of these bears a very inviting aspect, for the second sound is just that abrupt flapping character that might be supposed to result from the action of a thin valve. But it may be objected to this view, that the arteries, more than the heart, should be the seat of this sound. The tense column which throws these valves into play, should receive their shock more forcibly than the heart, which at that moment has become flaccid, and ill adapted to transmit sound or impulse (backwards) through the whole of its substance. There are some cases of disease which seem to militate against it. In a case described by Dr. Hope, the second sound on the left side was quite distinct, yet the aortic valves were found in a state of complete rigidity. (Case 20.) In another case, the second sound was remarkably loud on the left side with a weak pulse; yet, after death there was found disease of the mitral valve permitting free regurgitation, and contraction of the aorta: this combination of disease

must have diminished the action of the aortic valves. (Case 15.) The action of these valves will be strong, in proportion as the arteries are well filled, and the pulse strong, and the second sound should in this view be proportionally loud. On consulting the records of some cases of this description, I have not found this correspondence. Still I do not consider this view entirely disproved, and it should claim attention in future investigations.

2. This is Dr. Hope's explanation of the second sound: when the diastole takes place, the blood impelled by a number of concurrent circumstances, shoots with instantaneous velocity from the auricles into the ventricles; and the reaction of the ventricular walls on its particles, when their course is abruptly arrested by the completion of the diastole, is, he conceives, the cause of the loud, brief, and clear sound. The concurrent circumstances which impelled the blood into the ventricles at the moment of their diastole, are the distension of the auricles in which the blood has been accumulating during the ventricular contraction; the weight of the ventricles collapsing on the auricles thus distended; the width of the auriculo-ventricular orifices; and lastly, the sucking power of the ventricle in its diastole. With respect to this last, Dr. Hope does not assume that the ventricles have an actively dilating power further than what proceeds from the physical elasticity of their parietes, but such a power has been ascribed to them by Bichat, Pechlin, Carson, and others, and even by Laennec; and although opposed to what we at present know of animal dynamics, it would be rash to absolutely deny the possibility of its existence. The injection of the coronary arteries, which occurs the instant the systolic action ceases, may somewhat contribute to the dilatation of the ventricles. Whatever be the cause, the diastole in large animals is sufficient to force open the hand of a person grasping the ventricles, and it is therefore not surprising that this should have been ascribed to an actively dilating power. It is in favour of Dr. Hope's explanation of the second sound, that it does not falsify Laennec's signs of disease of the auricular valves; and although for acoustic reasons before stated, I should be inclined to place the seat of the sound in the parietes of the ventricles, rendered momentarily tense by the sudden influx of blood, rather than in the motions of the fluid, I incline to this explanation of the cause of the second sound.

Since the first announcement of M. Majendie's views respecting the causes of the sounds of the heart, two years since by M. Pigeaux, as quoted in the preceding part of this note by Dr. Williams, this distinguished physiologist has himself published his opinions on the subject, and which, if they were formerly and are again correctly reported, seem to have undergone a very important change. (See a translation of M. Majendie's memoir in the Medical Gazette, June 28, 1834.) He now attributes the *first sound* to the shock of the apex of the heart against the walls of the chest during the *systole* of the ventricles, and the *second sound* to a similar impulse of the anterior surface of the right ventricle during the *diastole* of the ventricles. The principle of the generation of the sound is indeed still the same, but the causes of the individual sounds are in some degree reversed. Against the truth of M. Majendie's principle many arguments may be adduced, and even, it would appear, some well-ascertained facts. I shall here state a few of these, for the substance of which I am indebted to my friend, the ingenious author of the first portion of the present note.

1. In the experiments by Dr. Hope the impression on Dr. Williams's mind is, that he distinctly heard the two sounds of the heart when this organ was removed from all contact with the thoracic parietes and the pericardium, and when the constant and close apposition of the stethoscope precluded the possibility of any sound being produced by any shock against it: and it will be seen hereafter that M. Bouillaud's conviction is similar.

2. To say nothing of the inconclusiveness of any arguments deduced from phenomena elicited under such an unnatural condition of things as existed in these experiments, it may be remarked, that the third and fourth are subject to fallacy, inasmuch as "the sonorous bodies" and "the sternum of the goose" might have given rise to sounds in consequence of the existence of an interval between them and the heart; a state of parts very different from the natural, in which the heart and the walls of the chest are in apposition, and which unnatural state of parts might have permitted the organ to communicate a shock to the bodies, utterly impossible in the natural state.

3. The facts adduced in the memoir after Exper. 4, and the 5th and 6th experiments, merely indicate that the sounds of the heart cannot be heard through a considerable layer of air, water, or healthy lung, facts long known; but M. Majendie has

yet to prove that any injection of air or water, separating the heart from the walls of the chest, will prevent these sounds from being audible over the left clavicle.

4. How will M. Majendie explain, in accordance with his views, the incontestible facts of the increased loudness and diminished impulse in dilatation, and the converse in hypertrophy? or the intensity of the sounds in the carotids, and at the top of the chest, in aneurisms of the arch of the aorta and innominata, in which cases they are often heard more distinctly than in the region of the heart itself!

It would further appear that since M. Majendie's paper was read before the Institute, M. Bouillaud has performed a series of experiments, with the same object, but with results the reverse of those announced by Majendie. The results of M. Bouillaud's experiments was, that he could always hear the two sounds of the heart although there was no point of contact between the organ and any portion of the walls of the chest. He indeed found that the friction of the heart against the end of the stethoscope gave rise to a particular sound; but this (merely a sound of rubbing) was so very different from the natural sound of the heart that the two could never be confounded. It was, moreover, ascertained, that the momentary palpitation of the empty organ, after it was separated from the body of the animal, was accompanied by no perceptible sound. M. Bouillaud's own opinion respecting the cause of both the sounds is, that they are owing to the play of the valves of the heart. (Journ. Hebdom. quoted in Med. Chir. Rev. July, 1834.) In reference to this opinion of M. Bouillaud, as also to that of Dr. Hope, I would observe that they both possess a degree of probability in my mind over all those which attribute the two sounds to two different causes. Although certainly characteristically different, yet the two sounds have so great a similarity and are so allied in time and place, that I cannot readily bring my mind to believe that they do not both depend upon one and the same cause slightly modified, or, at least, on the different play of the same parts. But the whole subject wants fresh investigation and the institution of a new set of experiments on large animals,—an investigation which cannot be entrusted to better hands than those of Dr. Hope and Dr. Williams.—*Transl.*

CHAPTER V.

OF CERTAIN ANOMALIES IN THE SOUND OF THE HEART AND ARTERIES.

These phenomena are the more remarkable, inasmuch as they are the only ones discovered by immediate auscultation, which do not depend on structural lesion of the organs in which they are produced.

Sect. I.—*Of the Bellows-sound of the heart and arteries.*

The heart and arteries, under certain circumstances, in place of the sound which naturally attends their dilatation, produce what I have denominated the *bellows-sound*, from the circumstance of its exactly resembling, in the greater number of cases at least, the noise produced by this instrument when used to blow the fire. This comparison is exact; and the cardiac sound is even frequently as loud as that of the machine. It however presents many varieties, some of which are so different from the others, that we should have difficulty in believing them to be of the same kind, were it not from the rapidity with which they succeed, and the insensible manner in which they shade into each other. These varieties are of three kinds.

1. *The bellows-sound, properly so called.*—This may accompany the diastole of the heart and arteries, and when present, it entirely replaces the natural sound of the ventricle, auricle, or artery: it ceases during the systole. In some very rare instances, indeed, the sound, more particularly in the carotids, but also in the heart, is changed into a continuous murmur, like that of the sea, or that which is produced by the application of a large shell to the ear. In cases of this kind, we can no longer distinguish, or we distinguish very imperfectly, the jerking action of the diastole. Sometimes we perceive this continuous murmur in one of the carotid or subclavian arteries, while that of the opposite side yields the common bellows-sound, answering to the arterial diastole. Most commonly the bellows-sound is acurately confined within the limits of the artery or ventricle: sometimes, however, it is diffused over a space much larger.

2. *Sound of the saw or rasp.*—This sound is exactly like that of one or other of the instruments named, heard more or less remotely, and is accompanied by the perception of roughness, conveyed by the action of these instruments.

3. *Musical or hissing bellows-sound.*—This variety is only met with in the arteries; at least I never observed it in the heart.* The common bellows-sound of the arteries frequently degenerates into this, particularly when the patient is unusually agitated from any cause, becoming like the sighing of wind through a key-hole, or the sound of a metallic cord which still vibrates long after being struck. These sounds are very distinct although never very loud; and occasionally they compose a certain succession of musical tones, as if the artery were become a vibrating string, from which two or three notes were drawn out in succession, by advancing and drawing back the finger upon it. In four cases I have met with this sound (which is literally musical) in the carotid arteries.† In one of these cases, I at first conceived the sound to arise from an instrument in the apartment below. On a close examination it was found, that the mu-

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* I have, at the moment of writing this note, (July 26, 1834,) a man under my care, in the Chichester Infirmary, in whom the *musical bellows-sound* exists in the heart, in the most striking manner, being so loud as to be distinctly audible without the stethoscope, at a short distance from the person's body. It is isochronous with the contraction of the ventricles, terminating in the *shock* of the heart. It resembles *exactly* the rather loud and shrill moan of an infant or puppy, which is kept up uninterruptedly with *every* expiration. Dr. Hope mentions a similar case (Treatise, p. 338,) and refers to one by Dr. Elliotson, in which there was a very large and long vegetation in the mitral valve.—*Transl.*

† The author records the exact *melody* in these cases, in musical notes, which I have omitted, as being matter of mere curiosity.—*Transl.*

times be confounded, by an inexperienced observer, wi
of quite a different kind. This is when the violent p
this artery, by compressing the summit of the lung, gi
a sibilous or mucous rhonchus in some of the bronch
the cause of this kind of rhonchus is readily ascertaine
isochronism with the pulse. I even think that I have
metallic tinkling produced in the same manner in a tu
excavation.—The bellows-sound of the heart becomes
bilous, and never in a very marked degree.

The bellows-sound, as well in the heart as arteries,
without any increase of the impulse. It may exist at
time in the four cavities of the heart, and over the wh
of the arterial system. I do not believe it ever exists in
Sometimes, however, I have been led to suspect its p
the jugulars; but, as after a few hours, the sound be
chronous with the carotid pulse, I concluded that it h
in this vessel. It much more frequently occupies the
than the auricles; sometimes, however, it is confined
ter; and very often it exists in one ventricle only. It f
is perceived in a high degree in the heart, without th
any similar sound in the arteries; more rarely the rev
case. It is usual for the sound to be perceived in a sm
ber of arteries at the same time, and over a certain par
course, without any thing of the same kind being foun
trunks or branches. The carotid and subclavian ar
those which exhibit it most commonly, and, next in or
quency, the abdominal aorta, the crural and brachia
The arteries of the right side give the sound more f
and in greater degree than those of the left side.

Cause of the bellows-sound.—I have known a co
number of persons die of different diseases, acute o
who had presented this phenomenon very distinctly, a

fices. No doubt it exists almost always in this case; but since the first publication of my treatise, I have very frequently met with it in individuals who had no lesion of the sort; while, on the other hand, I have seen ossifications of the valves which were not attended by this sound. I have likewise frequently observed it in the last agony, and in other circumstances when the heart is too full of blood, in which latter case it sometimes quickly yielded to bloodletting. I formerly also was inclined to consider this phenomenon as connected with the redness of the inner coat of the arteries, considered by some modern writers as an inflammatory affection; but I have since then found the arteries quite pale and perfectly sound, in every case which I have had occasion to examine. In like manner, I can state with certainty, that the bellows-sound of the heart is very often met with when this organ is perfectly healthy. From these data it results that this phenomenon is attributable either to an organic or vital condition of the artery—a sort of spasm or tension—or else to a particular condition of the blood itself, or to the manner in which it is moved. The last supposition is inadmissible, inasmuch as the phenomenon exists sometimes in one artery only.* For various reasons I consider this particular sound as owing to a real spasmodic contraction of the heart or arteries. On many occasions I have been struck with the complete resemblance of the sound produced by muscular contraction and that of the bellows-sound.† In resting the ear upon a pillow, if we contract the masseter muscles, or rather if we contract and relax them alternately, we give rise to sounds precisely like the bellows-sound of the arteries. In the following experiment the resemblance is more perfect still: if we place the stethoscope upon one of the condyles of the humerus of a person whose arm is supported by an assistant, and then cause the individual alternately to bend and to extend the fore-arm gently, we perceive a sound exactly similar to that produced by the blast of a pair of bellows.

In applying these remarks to the case in question, we can have no difficulty in admitting the possibility of spasm in an organ so completely muscular as the heart. In respect of the arteries, it may be said that the circular fibres, of which their middle or fibrinous coat is composed, seem to announce the existence of contractile power. But, besides, nothing seems to prove that the muscular is the only tissue susceptible of contraction and spasm; or, rather, a multitude of facts prove the contrary. We find the biliary ducts contracted in certain cases of icterus; the urethra and lachrymal ducts contract manifestly upon the sound: and even the skin contracts, in consequence of mental impressions, exhibiting the appearance commonly called goose-skin.* On the other hand, the circumstances under which the bellows-sound arises, and the rapidity with which it appears and disappears in some cases, seem to point it out, as being under the immediate influence of the nervous power.

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* Dr. Williams inclines to the opinion here renounced by Laennec. "I am myself disposed," he says, "to think, that were we better acquainted with the laws of the production of sound, we might find that it may be excited by the motion of liquids, as well as by that of air, in or against solids of a particular form; and that we might find a more satisfactory explanation of the phenomena in question in the moving mass of blood being thrown into sonorous vibration by some modification in its course. Such a modification might be produced by thickening or irregularity in one of the valves of the heart, or by spasmodic action of some of the columnæ carnæ, by an obstacle in the calibre of an artery, &c.: and these causes might, as in the analogous case of air, render the passage of the blood sonorous, instead of, as it usually is, silent." *Rat. Exp.* 50.—*Transl.*

† Here the author enters into a long dissertation on the sounds produced by muscular contraction, referring to the experiments of Dr. Wollaston, published in the Philosophical Transactions, for 1810, and to some similar ones by M. Erman, of Berlin, recorded in Gilbert's *Annalen* für Physik, 1812. I omit this discussion as of no practical value.—*Transl.*

It almost constantly exists in the heart in the case of contraction of the orifices of this organ; it very frequently occurs in hypertrophy or dilatation: but it is still more frequently met with, both in the heart and arteries, in persons who have no organic lesion of these parts, and who labour under various affections. The sole disorder which has appeared to me constantly, or almost constantly to accompany the bellows-sound, is a state of nervous agitation more or less marked; and which is always proportioned to the extent of the sound, that is, to the number and size of the arteries which yield it. On the other hand, we never meet with this sound in direct febrile excitement, unless the individual is at the same time very nervous.

When the bellows-sound exists at once in the aorta, the carotids, and the arteries of the extremities, the patient is in a state of extreme anxiety and distress; if it is present in the heart, and greater number of the arteries, life is in danger; although it is seldom that death actually ensues, unless there be at the same time organic disease of the heart. When, on the other hand, one or two arteries only are affected, for instance, the carotid and subclavian, we cannot always consider this as indicating a state of disease. The sound is very common in a slight degree, in hypochondriasis and hysteria. In persons affected with these diseases, it is most commonly met with in the subclavians and carotids, and sometimes in the abdominal aorta. Young persons, of a delicate and irritable habit, and subject to hæmorrhage, are especially susceptible of this affection; but I have also met with it in hypochondriacs in the decline of life, and who were very cachectic. I have frequently observed it in various kinds of hæmorrhage, for instance, hæmoptysis, menorrhagia, and apoplexy. On the other hand, it is very uncommon in cases of well-marked and pure inflammation. Once only, in the case of a delicate and irritable child, affected with croup, I observed it over the whole extent of the aorta; and it continued more than two years afterwards. It is in the case of young persons affected with hypochondriasis, that we can assure ourselves that the bellows-sound is a nervous affection. Most of these subjects present it only momentarily and in one or two arteries. When they are in a state of calmness and repose, if we apply the stethoscope over the carotids or subclavians, we perceive merely the natural sound of the arteries; but if the patient becomes in any way agitated,—if he walks quick, or coughs, or breathes deep, or experiences an emotion of pleasure or pain, hope or fear, the sound of the arterial pulse changes at once to the bellows-sound (which becomes sometimes hissing), and this progressively disappears as the individual becomes more composed. In these cases, after the complete disappearance of the bellows-sound, we can re-produce it by pressing lightly with the finger upon the artery, above or below the place where the stethoscope rests; and particularly by alternately increasing and diminishing the pressure. Sometimes it is sufficient to rest the ear rather strongly upon the instrument. When the sound is perceived in the heart, or in an artery, we can often excite it by the same means in other arteries, particularly in the brachial and crural. All these positive and negative facts tend, I think, to prove, that the bellows-sound is the consequence of spasm, and does not indicate any organic lesion of the heart or arteries. What will hereafter be stated respecting the *purring vibration*, and certain phenomena attending pregnancy, will confirm this proposition.[*]

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* See a valuable paper by Dr. Monro, "On the Spasmodic Contractions of Muscular Tubes," in a late number of the Ed. Journ. of Med. Sc.—*Transl.*

Before terminating this section I think it proper to say a few words respecting certain phenomena, which an inexperienced observer might sometimes mistake for the bellows-sound. 1. I formerly noticed the metallic clicking or jingle produced in certain cases, during percussion of the chest. Sometimes we observe

[*] M. Andral regards the bellows-sound, in certain circumstances, as owing to an increase in the quantity of blood. In this I quite agree with him; as also in referring the bellows-sound which we occasionally observe in plethoric subjects, in persons threatened with an impending hæmorrhage, and in the majority of females at the approach of the catamenia, (confined, be it observed, in these latter cases, to the vessels in the vicinity of the spot where the hæmorrhage is to take place,) rather to the same cause than to any modification of the innervation. I have at present under my care a young man whose heart is too voluminous and yet can hardly be termed hypertrophous, who frequently requires venesection. In this case there is a bellows-sound habitually present in the heart, aorta, subclavian, carotid, and even the brachial arteries; and the sound is always stronger when the necessity for losing blood is the greatest. This fact is, however, an exception to the general rule, as it is more common to find the bellows-sound increase after bloodletting. In chlorotic females I have sometimes found the sound diminish and gradually disappear after the use, for some weeks, of steel and a better diet,—that is, when the quantity of blood was increased or its quality changed, or both.—(*M. L.*)

The bellows-sound, sometimes alone but more frequently accompanied by the *jarring tremor*, is very constantly present in the external thyroid arteries in cases of bronchocele of considerable size; and I have observed it gradually to disappear as the tumour was absorbed under the use of iodine.—*Transl.*

a slight jingle of the same kind in the cardiac region, in persons affected with nervous palpitations, when the heart beating with quickness and violence, but with little real impulse, the point of it only comes in contact with the walls. At each pulsation of the ventricles, in this case, a slight clicking, or jingle is heard, as if originating within the tube of the stethoscope and traversing it. 2. In other cases, I have perceived in the same place, but more profoundly, a sound like the creaking of a new saddle. I for some time imagined that this sound might be a sign of pericarditis, but I afterwards convinced myself that this was a mistake. I have since thought that it occurred in cases where the heart, of large size, or distended with blood, is rather confined in the lower mediastinum, and when there is some air in the pericardium; and also in another case, to be noticed presently.* 3. In some persons the pleura and anterior edge of the lungs extend before the heart so as to cover it almost entirely. If we examine a subject of this kind during strong action of the heart, we find that the ventricles, during dilatation, compress these portions of lung, and thereby modify the respiratory sound so as to make it more or less resemble the bellows-sound. 4. Lastly, a mistake may originate from the sound of muscular contraction in the vicinity of the artery we are exploring, as from the action of the mastoid muscles in the vicinity of the carotids; but this error cannot be committed, without great inattention.†

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* We shall hereafter find, when treating of pericarditis, that this *sound of the saddle* or *leather-creak*, is in reality what Laennec first supposed it to be, a sign of pericarditis, and a very important one.—*Transl.*

† In the preceding section I do not think that Laennec has sufficiently separated what is of practical utility from what is merely curious. It is impossible, in my opinion, to refer the *bellows-sound*, the *rasp-sound*, and the *leather-sound*, to the same cause, much less to make them out to be of equal value as signs. The pure bellows-sound appears to be a merely vital phenomenon, either dependent on the state of the innervation or on some modification in the quantity or quality of the blood; while the rasp-sound and leather-sound are invariably connected with well-marked organic lesions. The first when heard in the region of the heart (and notwithstanding the opposite authority of my revered master, I must deny that it has ever been heard elsewhere) is a certain index of a mechanical obstacle to the course of the blood, being indeed, as we shall see hereafter, the pathognomonic sign of the cartilaginous or bony induration of the valves,—that is to say, provided it be constantly present after it is once produced. The *leather-creak* is equally pathognomonic of pericarditis with very slight or with no effusion—that is, of a pericardium having its free surface become rough and unequal. (*M. L.*)

In reference to these adventitious sounds, collectively and individually, I think the following conclusions may be deduced from the consideration of them:—

1. The source of the sounds is some impediment to the usual current of the blood, from some physical alteration in the channel through which it passes, whereby such vibrations are excited in the column of fluid as to give rise to audible sound.

2. The alteration in the channel may be merely temporary, and produced in parts possessing a healthy structure, from nervous causes, from want of the natural harmony of proportion between the size of the channel and its contents, and probably from other unknown causes. The more common cause, however, is some fixed physical alteration in the channels conveying the blood; either a contraction or enlargement of caliber, or some other deviation from the natural structure, whereby the current is more or less impeded or disturbed.

Sect. II.—*Of the Purring or Whirring Vibration, Tremor or Thrill, of the Heart and Arteries.*

I noticed under this name, in the first edition of the present work, a particular sensation perceived by the hand in the cardiac region, and which I considered with Corvisart, who I believe first observed it, as a sign of ossification of the valves, and particularly of the mitral. This phenomenon, no doubt, is met with in almost every case of considerable contraction of the orifices; but since the first publication of my treatise, I have frequently met with it in cases where no organic lesion existed. I have, moreover, observed in the arteries a phenomenon which I consider as quite identical, although presenting occasionally some slight and variable differences. The purring vibration of the heart may be very exactly compared with the thrill which attends the murmur of satisfaction expressed by the cat when stroked by the hand. We may also convey some idea of it by passing a rather rough brush along thé palm of the hand covered

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3. We are not justified, by the mere presence of any of these sounds, in concluding that organic disease of the valves or valvular orifices exists.

4. If the morbid sounds disappear after repose, bloodletting, or other form of depletion, or without any evident cause, we may suspect that they originate in mere functional disorder; and the probability of this opinion will be increased in proportion to the period of their absence.

5. If they are not removed by these or any other causes, or if they are removed for a very short period only, or are merely lessened in degree, we may conclude that they originate in disease of the valvular orifices; and this conclusion will be still further strengthened if there exist other symptoms of diseased heart.

6. The probability of organic disease is increased in proportion as the character of the sounds approaches that of the sound of the saw or rasp.

7. The sounds produced by valvular disease become much weaker when the contraction of the orifice is extreme than when it is moderate, a certain extent and force of current being requisite to produce them in the highest degree. Dr. Hope says, that he has often found that when the orifice was reduced to a crevice of two or three lines in width, no sound whatever was produced.

8. The following is a brief sketch of the *rationale* of the morbid or anormal sounds resulting from valvular disease, for which we are indebted to the able physician just named.

a. When the *aortic orifice* is contracted, an adventitious sound, or morbid murmur, accompanies the ventricular systole and first sound; and when the valves, not closing accurately, permit regurgitation from the aorta, a morbid murmur accompanies the diastole and second sound also; but this last, when it occurs, is extremely slight and brief, as the influx of blood from the auricle, during the diastole, almost instantly puts an end to any regurgitation capable of producing sound.

b. When the *pulmonic orifice* is contracted, the effects are the same; but disease of the valves on this side of the heart, as will be shown in another place, is comparatively very rare.

c. When the *mitral orifice* is contracted, a morbid murmur accompanies and sometimes entirely supersedes the second sound, being occasioned by the passage of the blood from the auricle into the ventricle during the diastole of the latter. When the valve, not closing accurately, admits of regurgitation, a murmur accompanies the first sound, and this is sometimes excited by a degree of disease insufficient to produce it during the second.

d. When the *tricuspid orifice* is contracted, the results are the same as in the last case. (Cyc. of Pract. Med. vol. i. Art. *Auscultation.*)—*Transl.*

with a glove. This thrill becomes frequently more perceptible when the patient speaks; no doubt, because it is then blended with the analogous sensation produced by the resonance of the voice within the chest. This tremor or vibration is almost always confined to the left cardiac region, (and the hand must be applied with some force in order to feel it;) but I have sometimes perceived it nearly over the whole anterior part of the chest, and even at the upper part of the sternum.

The thrill of the arteries presents several varieties. Most commonly it is very like that just described, and is exactly confined within the caliber of the vessel. In this case the thrill is successively renewed like the pulse; it is more perceptible by means of a moderate than a very slight pressure, but diminishes under a strong pressure. Sometimes, on the other hand, and particularly when seated in the carotids, the thrill is much more extended than the diameter of the artery, and seems more superficial; it is occasionally perceptible over a space of two inches in breadth on the side of the neck. In this case the thrill is continuous and without any pulsative momentum; and its sphere seems more extended, the lighter the pressure is made with the finger. The arteries in which this phenomenon is most commonly observed, are, in the first place, the carotids, and the the subclavian, brachial, and crural; it is sometimes, but rarely, met with in the ascending aorta (that is, under the top of the sternum,) and even in the abdominal aorta. It is not found very distinct in the smaller arteries, for instance, the radial. However, when it exists in the heart or larger arteries, or even when the simple bellows-sound merely exists in these, the pulse frequently presents a sort of epitome of the purring vibration, a slight thrill which, although accompanying the diastole of the artery, seems independent of this.

Corvisart was acquainted with this character of the pulse (although he has not noticed the thrill of the larger arteries,) and considered it as pointing out the existence of the same phenomenon in the heart in a greater degree, and as a sign of ossification of the valves.* This state of the pulse, however, is by no means constant: it is frequently met with, as I have said, when the purring thrill exists no where else, and it is sometimes wanting when this exists in the cardiac region. In every case where I perceive this state of pulse, I remark that a great many of my pupils cannot distinguish it; and I did not myself perceive it until after I had noticed the phenomenon in the larger arteries. It is extremely uncommon to find the purring thrill in the heart or in an artery, unaccompanied with the bellows-sound; I am even doubtful if the former ever existed without some trace of the latter. In two cases only I have observed a very evident thrill in the carotid, with a bellows-sound so obscure as to be doubtful; but in almost every case, the latter phenomenon exists at the same time, and in a much more definite and striking degree than the latter. On the other hand, we are certain that the purring thrill is not identical with the bellows-sound, and owing to the same cause, since we find that the latter, when most strikingly marked, is not always accompanied by the former. Very often when the bellows-sound is diffused, the purring thrill is quite confined within the limits of the artery, and *vice versâ.* Both these phenomena are frequently attended with a greater pulsation than usual; at other times, the reverse obtains. I have often found the pulsation of the left carotid stronger than that of the right, although the latter alone presented the phenomenon in question.—Bloodletting, which commonly diminishes the intensity of these sounds, at other times modifies them in a singular manner. I have thus seen, in a case of hemiplegia unaccompanied by any disease of the heart, inflammation or plethora, the bellows-sound become, after bloodletting, much less in the cardiac region, the aorta, and left carotid, but stronger in the right carotid, as did also the purring thrill.

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* Traité des Mal. du Cœur, 3e éd. p. 240.

It might be supposed that the immediate cause of a phenomenon so well marked as the purring vibrations of the heart and arteries, would be easily discovered. I must, however, confess, that all my endeavours to do so have hitherto failed. Of this much I am well assured, that it does not depend on any fixed organic affection; and that in the arteries, more especially, it exists in a striking degree, when the whole of their tunics are in the soundest condition as to colour, consistence, thickness, &c. It seems to me extremely probable, that the phenomenon in question depends upon a peculiar modification of the nervous influence.*

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* The purring thrill of the arteries may, like the bellows-sound, be merely a vital phenomenon, or dependent on some modification of the innervation; but the purring thrill of the heart is, like the sound of the rasp, with which it constantly coincides, the effect of a mechanical obstacle to the course of the blood. At least, I have myself never observed it, except in persons in whom a post-mortem examination discovered either indurated valves, or a manifest disproportion between the size of the heart and the caliber of the large arteries. Neither do I recollect to have found this phenomenon *intermittent*, a thing which ought to be common, if it were merely a nervous affection.—(*M. L.*)

I agree with Dr. Mer. Laennec in believing, that when " the thrill exists in the region of the heart, it is identical with the sound of the saw, rasp, or bellows: the difference being in the sense which perceives, not in the thing perceived. If we could always say, from the character of the thrill, with which of the two sounds of the heart it is identical, it would be more valuable as a sign than it is. It is proper to observe that we do not always hear any of the sounds when we feel the vibration; nor, conversely, do we always feel the vibration when we hear the sound. This, however, is not any proof that both do not spring from the same physical cause. The cause may exist in a degree sufficient to excite one sensation and not the other; just as we may feel or see the vibration of a musical string after the ear has ceased to hear any sound from it. It is, therefore, we conceive, without good grounds, that our author considers the separate existence of these phenomena as proofs of their non-identity. Dr. Hope says that, although resulting from the same causes as the morbid

A man debilitated by syphilis, had no thrill or bellows-sound in the heart or arteries, when lying down, or sitting up in the usual manner; but if he raised himself in bed, supporting himself on his elbow, a slight but very distinct purring thrill and also bellows-sound became perceptible over the extent of an inch square, a little above the right clavicle; and both these disappeared upon the patient assuming the sitting posture.

SECT. III.—*Of the Pulsation of the Heart perceived at some distance from the Chest.*

It had long been believed, but rather on the faith of traditional report than from actual observation, that the pulsations of the heart may be sometimes heard at a certain distance from the patient. Corvisart informs us, that he had observed this fact but once, and only then on placing the ear very near the chest. Many years since, I was informed by several patients, that they were subject to palpitations of such severity, that they could be heard at the distance of several paces: and one of these patients, as well as persons of credibility, witnesses of the fact, assured me that, in his case, the palpitations could be heard in the chamber adjoining that in which he slept. I observed this phenomenon for the first time in the year 1823, in the case of a young woman; and having since then paid particular attention to the circumstance, I am convinced that although it is very uncommon to meet with it in so great a degree as that just mentioned, it is very common to find it in a less degree, such, namely, as to be heard at a distance of from two to ten inches from the chest. Several of my colleagues, to whom I had mentioned the fact, had likewise noticed it several times since; and M. Lerminier, among others, was kind enough to send to my Clinic, in 1824, two patients in whom it was perceptible in a very considerable degree. In no case have I myself heard the pulsation at a greater distance than a foot and a half or two feet; but we can readily admit the possibility of this. I have several times ascertained from the perfect accordance of the sound with the pulse, that it was owing to the contraction of the ventricles. I do not recollect to have ever heard it produced by the auricles. Out of more than twenty subjects in whom I have heard the pulsation at a distance of from two inches to two feet,—three or four, at most, were affected with

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sounds, *the purring tremor* or thrill requires, *cæteris paribus*, a stronger current for its production; for which reason it less frequently accompanies the passage of the blood from the auricles into the ventricles, than from the latter into their respective arteries, [illegible] into the auricles by a retrograde movement. Even in the latter cases, Dr. Hope [illegible] it is seldom strong unless the ventricle be hypertrophous, or the circulation [illegible] In no case have I had occasion to observe the thrill more constantly and [illegible] the thyroid arteries in cases of large bronchocele.—*Transl.*

organic disease of the heart. All the rest laboured under palpitation of a purely nervous kind: and several were only so affected after quick walking, or ascending a staircase. In all of them the effect was temporary, and several, after a certain time, regained perfect health. The bellows-sound and purring thrill, frequently exist, in a slight degree, particularly in the arteries, in such cases. Never having had an opportunity of examining the body of any one who had presented this phenomenon, I cannot speak with any certainty as to the organic cause of it; but I am induced to consider it as owing to the presence of a greater or less quantity of air in the pericardium.* The ossification of some external part of the heart, may also give rise to the phenomenon; but I have met with no example of the kind.

CHAPTER VI.

OF PALPITATION OF THE HEART.

By palpitation of the heart is meant, in the common language of medicine, every beating of the heart which is sensible and unpleasant to the individual, and at the same time, more frequent than natural, and sometimes unequal, both as to force and extent. When this affection is studied by the aid of the stethoscope, we find that there are many varieties of it, all of which appear to have merely this character in common, that the individual is sensible of the heart's action. Frequently, also, the patient *hears* the pulsations, especially when in the horizontal posture. In the upright position, the contraction of the ventricles only is heard; while, when lying on the side, the individual is sensible of a pulsation in his ear double that of the pulse, namely, the alternate contraction of both the ventricles and auricles. I have often repeated this observation on myself, in states of wakefulness attended by slight palpitation. In many cases there is merely an increased frequency of pulsation, although the patient imagines, from his sensations, that there is also great increase of force. This species of palpitation is most common in dilatation of the ventricles, and lasts the longest of any. I have known it continue eight days; the pulse remaining, through the whole of this time, extremely small and weak, and between 160 and 180.

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* This seems a very gratuitous, and to me a most untenable explanation; and the assertion that follows it, and which I have not translated, viz. "that all sounds produced in the animal body and audible by the naked ear, are owing to the motion of substances in contact with air," is still more extraordinary. I have myself witnessed the fact mentioned, but have never thought of attributing it to any other causes than to a modification of those by which we are enabled to hear the sound, in all cases, by means of the stethoscope. A slight sound is perceived through a good conductor (the instrument); a more intense one may be heard through a bad conductor (the air.)—*Transl.*

Another variety consists in an increase both of the frequency and force of pulsation. This is what arises in healthy persons from great exertion or from moral causes. It also accompanies slight degrees of hypertrophy; in which case, the impulse of the ventricles becomes greater than natural. These two kinds of palpitation cannot be distinguished except by the statements of the patient, and the acceleration of the circulation. The sound and sphere of the heart's pulsations are almost always increased during palpitation: on which account, we must never draw any conclusions from the exploration of the circulation by the stethoscope, unless this has been made during a state of the most perfect quietude:—that is to say,—not till after a sufficient rest, if the person has been exercising himself; or during the most perfect quietude, if there already exists disease of the heart.

In simple hypertrophy in a high degree, during palpitation the ventricles are found to contract with great force, and seem to elevate the thoracic parietes in an extent and to a height much greater than natural. The sound, however, produced by the contraction is much duller and more indistinct than usual; and this circumstance, together with the increased frequency of pulsation, frequently prevents the contractions of the auricle from being distinguished. The extent of the thorax over which the pulsation is perceptible is not increased; and, notwithstanding the increase of the heart's power to double or triple its ordinary force, the pulse is, almost always, two or three times more feeble and smaller than in the natural condition of the circulation. When the palpitation lasts several successive days, and there supervenes much oppression on the chest, with livid countenance and cold extremities, the pulse becomes almost imperceptible, the action of the heart, excessively frequent, loses its impulse, becomes sometimes more sonorous, and at length indistinct or undistinguishable for some days before death. In hypertrophy with dilatation, the impulse, sound, and extent of the heart's action, are usually equally increased, during palpitation; and it is more especially in this case, and when both affections exist in a moderate degree, that we find the pulsations of the heart resembling, as formerly mentioned, the blow of the mallet.

CHAPTER VII.

OF IRREGULARITIES IN THE PULSATIONS OF THE HEART.

Irregularity in the pulsations of the heart may exist without palpitation. In old persons this is often met with without any perceptible alteration of the general health. The irregularity which occurs in palpitation consists usually in mere variations in the frequency of the heart's pulsation. Sometimes this variation is almost constantly recurring; at other times it is at long intervals, and consists only of a few contractions longer or shorter than the rest. Sometimes, amid a series of pulsations, very unequal among themselves, a single one will occur one-half shorter than the rest. This gives rise to something like an intermission; and it completely resembles this, if the pulsation is weaker as well as shorter than the others. The variations of frequency most commonly implicate, as in this case, complete pulsations; but they sometimes are owing to the mere increase or diminution of the period of contraction of the ventricles. These irregularities as to frequency, take place most usually in persons affected with dilatation of the heart. It is during the existence of palpitation more especially, in the case of hypertrophy, that we observe those prolonged contractions of the ventricles, which completely mask the sound of the auricles. No doubt these contract; but owing to the want of any visible interval between the contractions of the ventricles, they are not perceived. It sometimes, though very rarely, happens during palpitation, that each contraction of the ventricles is followed by several successive contractions of the auricles, so quick as only to equal in point of time one ordinary contraction. In this sort of palpitation, I have sometimes reckoned two pulsations of the auricles for one of the ventricles; sometimes four; but most commonly three. In one case of hypertrophy of the left ventricle, I saw this species of irregularity continue for several days without any variation. Sometimes after a long succession of regular contractions we observe only one or two of the kind just mentioned. Neither this nor the preceding variety occasions any sensible alteration in the pulse; I have only observed them in cases of hypertrophy.

The above are the principal kinds of palpitation with irregular action of the heart; but there are many others, although I have not yet examined them with the stethoscope. Of this kind, in particular, is one which sometimes is observed during palpitation from hypertrophy; in this there is a suspension of the pulse, during which the artery remains full and tense, and resists strongly the compressing finger. This variety is observed most frequently, or almost constantly during fits of coughing; at which times the heart cannot be examined on account of the agitation of the walls of the chest.

CHAPTER VIII.

OF INTERMISSIONS IN THE PULSATIONS OF THE HEART.

By *intermission* we usually understand a sudden and momentary suspension of the pulse, during which the artery is no longer perceptible beneath the finger. The duration of the intermission is very variable, and may serve to divide this affection into well-marked varieties. Sometimes the intermission is shorter than one arterial pulsation; sometimes it is equal; and sometimes it is longer. We can distinguish two kinds of intermission,—the one *real*, consisting in an actual suspension of the heart's contractions; the other *false*, depending on contractions so feeble as to be imperceptible, or almost imperceptible, to the touch, in the arteries. Intermissions of the first kind are most common: they are frequent in old age, even during health; and they show themselves in such as are not usually subject to them, during very slight indispositions. In middle age they are only observed in certain diseased states of the heart, particularly hypertrophy of the ventricles, and during palpitation: they would perhaps be more properly named *retardations* or *stoppages* of the pulse. By means of the stethoscope we ascertain that this species of intermission always succeeds the contraction of the auricles. It, therefore, only differs from the natural quiescence after this contraction, in the irregularity of its recurrence.

The duration and recurrence of this species of suspension of the heart's action are very variable. Frequently during a close succession of similar intermissions, some are equal to a complete contraction of the heart, others are only one-half, a third, or fourth as long, and some are barely perceptible. Their recurrence is equally uncertain;—they being sometimes perceived after each pulsation, or nearly so, and then not until after ten, twenty, or even one hundred pulsations. If, in our examinations, we content ourselves with feeling the pulse, without applying the stethoscope, we shall, of necessity, confound this true intermission with the false one formerly mentioned, produced by variations in the duration and force of the heart's pulsations. By the stethoscope, however, we can very readily distinguish it from the *retardations*. It is not so easy to draw the line between this and the repeated contractions of the auricles also mentioned before. The feebler, shorter, and quicker pulsations completely resemble the auricular contractions; and if, after a distinct contraction of the ventricles, distinguished by its impulse and its dull and prolonged sound, there supervene three feebler contractions attended by a much clearer sound, we cannot be certain whether these are owing to a threefold contraction of the auricle, or whether the first is the contraction of the auricle, and the two last are a regular ventricular and auricular contraction. Should there exist two or four of these contractions, there will be no uncertainty.

The last species of intermission is that which consists in the absence of one complete pulsation, recurring sometimes with an exact periodicity, after longer or shorter intervals, the pulse being in other respects regular. This pulse constitutes, according to Solano, the precursor of a critical diarrhœa. This peculiarity of the circulation is by no means rare; I have observed it frequently in some epidemics, but not at all in others, owing no doubt to the particular constitution that prevailed. This kind of intermission corresponds more frequently to a contraction of the ventricles, much weaker than the rest, than to a real interruption of their action; and, indeed, in such cases, we often perceive an extremely feeble pulsation in place of a total intermission.* I have not hitherto had an opportunity of examining the state of the heart in that species of intermission, which is attended by a continued state of fulness of the artery. We ought to consider it, from analogy, as taking place immediately after the contraction of the ventricles; and that their contraction continues during the period of their intermission.

Many of the facts adduced in the foregoing analysis of the pulsation of the heart, suffice to prove, that the application of the hand to the cardiac region, and feeling the pulse, are very inadequate guides to the real state of the circulation. The examination of the pulse, in particular, at least as it has been hitherto done without any corresponding exploration of the heart, is as often calculated to mislead as to supply us with useful indications; and notwithstanding the ingenious and subtile researches of Galen, Solano, Bordeu, and Fouquet, and the physicians of China, I conceive that every candid practitioner must have often said with Celsus—"Venis . . . . maximè credimus fallacissemæ rei." I am far from wishing to call in question the accuracy of all the observations of the above-named authors; on the contrary, I admit that some of the most curious are, in a general point of view, well founded; for instance, I think we often observe the *dicrote* pulse precede or accompany epistaxis, the *undulating* pulse attend vomiting, the intermitting pulse accompanying diarrhœa, and believe that we may admit (with pretty numerous exceptions however) the distinction of pulses into *superior* and *inferior*. But admitting the utility of the pulse in these respects, it is yet more evident, that it frequently supplies us with no indications at all, or with such as are deceitful in still more important respects,—for instance, in relation to bloodletting, to the prognosis in all diseases, and to the diagnosis in several. What Celsus says of it in regard to fevers, is still more applicable in diseases of the lungs and heart. We have seen, that, in pneumonia and pleurisy, the absence of fever and a perfectly natural state of the pulse, frequently accompany a severe, extensive, and incurable disease. In phthisis, the hectic fever is sometimes suspended during whole months. In diseases of the heart, the pulse is often feeble, sometimes even almost imperceptible, although the heart's contraction, that especially of the left ventricle, is much more energetic than natural. In apoplexy, on the contrary, we often meet with a very strong pulse in persons in whom the impulse of the heart is scarcely observable. These two opposite facts may easily be verified by the use of the stethoscope: I have myself done so, daily, during the last ten years. They appear quite inexplicable, unless we admit the arteries to possess a power of action independent of that of the heart.

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* In certain cases of diseased heart I have observed this species of intermission under a form which was sometimes productive of curious results. Every second pulsation was so feeble as to be altogether or almost entirely imperceptible. In the former case, the pulse appeared to be quite regular and slow; but, while in the act of feeling it, the intermediate or *latent* pulsation (if I may use the expression) became suddenly distinct, and the pulse was instantly *doubled*. In this manner I have known the same patient with a regular pulse at fifty or sixty, and a regular pulse at one hundred or one hundred and twenty, within the space of three minutes.—*Transl.*

It would seem to be proved, also, by many other facts, that the different systems subservient to the circulation, although necessarily and reciprocally dependent, have still, in other respects, a particular or individual existence, which, in certain states of disease, and in certain individuals, is more marked and isolated than in ordinary cases and circumstances. This view of the case is supported by the observations of practitioners, in all ages, of the different effects of bleeding, according as it is general or local, venous or arterial, depletive or derivative. The same is shown by the great benefit of a natural hæmorrhage of a few ounces only, and the inefficacy of copious venesection in the same case; and by the trifling degree of exhaustion produced sometimes by very profuse hæmorrhage, compared with the great collapse occasioned by the bleeding of a few leeches in the same person. I am acquainted with a man, who has been repeatedly bled to the extent of eight or twelve ounces, without being thereby at all debilitated, but in whom the application of only two leeches to the anus, has, on two different occasions, produced an extreme degree of muscular debility. These facts prove, I think, that the capillary circulation is in some sort independent of the general. The influence of the latter on the former seems very inconsiderable indeed in certain hæmorrhages from the uterus, bowels, nose or lungs, which are found to be very little affected by the most copious venesection. The mere state of the pulse, then, is far from indicating the state of the circulation in general: it does not even certainly indicate its condition in the whole heart, as it merely corresponds with the contraction of the left ventricle, which may be regular at the time when that of the auricles and right ventricle is irregular. In like manner, the state of the pulse fails to be a sure guide as to the expediency of bloodletting. Every one knows that in certain cases, for instance, in apoplexy, pneumonia, pleurisy, and inflammatory affections of the abdomen, the weakness and smallness of the pulse do not always contra-indicate venesection; on the contrary, that the artery, in such cases, frequently recovers its force and fulness after the loss of blood. The recognition of this kind of pulse *(fictitié debilis)* is one of the most important and difficult points in the treatment of acute diseases, as an error in respect of it may be fatal. In cases of this sort the stethoscope affords a rule much surer than the pulse. Whenever the contraction of the ventricles is energetic, we may bleed without fear,—the pulse will rise; but if the contractions of the heart are feeble, although the pulse still retain a certain degree of strength, we must be cautious respecting the employment of venesection. When the pulse is very strong, and the contraction of the heart moderately strong, (as is frequently the case in apoplexy,) we may still bleed with advantage as long as there is not a marked diminution in the sound and impulse of the heart. But when both the pulse and the heart are feeble, we must not open a vein, whatever be the *name* or seat of the disease, as such practice must infallibly destroy the few resources still left to nature. The most we can do in such a case, if there be any local congestion, is, by the application of a few leeches, to try if the patient can bear the subtraction of blood from the capillaries. The certainty and facility with which the cylinder indicates the propriety of bloodletting in such cases as those above mentioned, (which have hitherto been considered among the most difficult in practical medicine,) appears to me to be one of the greatest advantages to be derived from the employment of this instrument. It is certainly of the most general application, as it refers to the employment of one of our therapeutic measures, which is the most useful or the most injurious of any, and which may be had recourse to in almost all diseases.

After what has been said, and after its general uncertainty avowed by the most experienced practitioners, it may seem surprising that the practice of feeling the pulse has been so generally followed in all ages. The reason of the practice is, however, sufficiently obvious: it is of easy performance, and gives little inconvenience either to the physician or patient; the cleverest, it is true, can derive from it but a few indications and uncertain conjectures; but the most ignorant can, without exposing themselves, deduce from it all sorts of indications. Its very uncertainty gives it a preference with persons of inferior qualifications, over means quite certain in their nature, and which enable the non-professional observer to judge of the skill of the physician by the correctness of his diagnosis and prognosis. This last reason, more than any other, leads one to believe, that long after the utility of mediate auscultation shall have been unanimously admitted by the better informed members of the profession, many practitioners will still be found to neglect or even to disdain it, (as they now do percussion,) who will, nevertheless, think their time not at all mispent in feeling the pulse of an hypochondriac, or in examining, day after day, the fecal excretions of a peripneumonic patient.

The facts above stated relative to the discordance (often very great) existing between the pulsation of the heart and of the arteries,—more especially as to strength, are contrary to the more general opinion of modern physiologists, who consider the action of the arteries as entirely dependent on that of the heart. Bichat himself has fallen into this error. "To every species of action of the heart (he says) there corresponds a particular kind of pulse. I am astonished that the authors who have so much differed on this point, have never thought of having recourse to experiments to settle the question. No doubt there are many modifications of the pulse which would not be found to correspond with any visible modification of the movements of the heart; but the frequent and slow pulse, the strong and weak, the intermitting, undulating, &c. are at once understood in laying bare the heart and placing the finger on the artery at the same time. In this case we constantly observe that for every modification of the arterial pulsation there is a corresponding modification of the pulsation of the heart;—which would not be the case, if the pulse depended on a vital contraction of the arteries."* I am not prepared to say how far we can compare the *visible* pulsations of the heart to the *felt* pulsations of the arteries,—a comparison the less to be depended on, seeing it can only be made on an animal expiring in torture: but I am well assured that we shall soon be convinced of the truth of the opposite opinion, on examining, comparatively, the pulse and the heart in certain diseases, particularly apoplexy and affections of the heart. What was said of the bellows-sound and purring thrill of the heart and arteries, goes also to the corroboration of the same opinion.†

In bringing to a conclusion this analysis of the heart's contractions, in health and disease, I ought to state, that the exploration of this organ is the case in which immediate, compared with mediate auscultation, would be least defective; were it not, for reasons formerly mentioned, nearly impracticable in many cases. Its principal inconveniences are,—the impossibility of closely applying the ear at the lower part of the sternum in many cases: the perception of the action of both sides of the heart at the same time; the conjunction of the sound of respiration or of those depending on the presence of gas in the stomach, with the sound of the heart; and, sometimes, the much too great intensity of the impulse and sound of the heart, when perceived over too large a surface,—a circumstance which prevents our being able to analyze readily the motion of its several parts.

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* Anat. Gen. t. ii. p. 136. *Ed. de Beclard.*

† The argument here derived from auscultation, in favour of the independent powers of the capillaries, is an important addition to those formerly advanced on this side of the question. For a complete view of the evidence on both sides, I refer the reader to Dr. Bostock's admirable *System of Physiology*, vol. i. p. 381, and to the works of Drs. Parry (sen. and jun.), Philip, Hastings, Thomson, Young, Kerr, Carson, Hunter, C. Bell, &c.—*Transl.*

BOOK SECOND.

OF DISEASES OF THE HEART.

CHAPTER I.

OF DISEASES OF THE HEART IN GENERAL.

SECT. I.—*Of the Symptoms common to all Diseases of the Heart.*

It will appear from the analysis in the preceding Book, that the employment of the stethoscope supplies us with signs more precise and more fitted for enabling us to distinguish the principal diseases of the heart, than those which had been previously known. On this account we need insist the less upon the general and local symptoms, by which it had been previously sought to recognize these diseases. In the present section I shall confine myself to the notice of such only as accompany the greater number of these affections when they have reached a certain degree of severity.

The severest and most common diseases of the heart are—dilatation of the ventricles, thickening of the walls of these, or the reunion of both affections. Most frequently a single ventricle is affected; sometimes both are so in a similar, or in an opposite manner, as in the common case of dilatation of the right ventricle with hypertrophy of the left, and *vice versa.* The persistence of the foramen ovale, the perforation of the septum between the ventricles, the ossification of the sigmoid valves of the aorta or of the mitral valve, excrescences on the same parts, and accidental productions formed in the heart, are of much rarer occurrence, and do not, generally speaking, impair the health, until they have reached such a degree as to give rise to hypertrophy, or dilatation of the ventricles. The dilatation and hypertrophy of the auricles are rarer still, and are, perhaps, always consecutive affections depending on previous disease of the valves or ventricles.

The general symptoms of all these affections are almost the same:—They are, an habitually short and difficult respiration; palpitations and oppressions constantly produced by the action of ascending, by quick walking, by emotions of mind,—or without any perceptible cause; frightful dreams, and sleep frequently disturbed by sudden starts; a cachectic paleness and a tendency to anasarca, which disease, indeed, comes on after the disease has persisted some time. To these symptoms is frequently added the *Angina Pectoris*,—a nervous affection, which will be described hereafter. When the disease has reached a high degree, it is recognized at a single glance. The patient, unable to bear the horizontal posture, remains night and day sitting rather than lying in his bed, with the face more or less swollen, sometimes very pale, but more commonly of a deep violet blue tint, either over the whole or only on the cheeks. The lips are swollen and prominent like a negro's, more livid than the rest of the face, or of this hue when it is quite pale. The lower extremities are œdematous; and the scrotum or labia, the trunk of the body, the arms, and even the face, are successively affected in the same manner. The same state exists in the serous membranes, whence arise ascites, hydrothorax, and hydropericardium, which accompany organic affections of the heart more frequently than any other disease. The congestion and lentor of the capillary circulation are further shown by affections of the internal organs; for instance – hæmoptysis, pains of the stomach, vomiting, apoplexy (which frequently terminates such affections,) and most of all, dyspnœa, which last symptom has been the cause of confounding such diseases (with many others) under the name of *Asthma*. These symptoms, however, as they show themselves in the diseases of the heart, have peculiar characters which tend to distinguish them from such as occur in the affections most likely to be confounded with them, more particularly cases of asthma, which depend, for the most part, either on a dry catarrh or a morbid condition of the nervous system.

In the diseases of the heart the general circulation is not always so much affected as the capillary. Sometimes the pulse is irregular, but sometimes it is almost natural; and the hand applied to the cardiac region, discovers only a regular and moderate pulsation. At other times the pulse is very strong, or altogether imperceptible; the heart yields a very great impulse, or none at all, its contractions are evidently irregular, and palpitation is constantly present.* So severe a state of disease as this, is not

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* The epitome of the general symptoms given by our author is excellent, as far as it goes; but it must be admitted that the paramount importance of the auscultatory diagnostics, in his mind, has rendered this epitome too brief. I would, therefore, recommend to the reader's attention the ampler details on this subject in the classical works of Corvisart, Testa, Kreysig, Bertin and Hope. In the latter stages of organic affections of the heart, the diagnosis is always easy; generally even without the aid of the stethoscope,—almost certainly with it. In the very earliest stages, however, (the only period, be it remembered, in which medical treatment can be of much use,) the practitioner often finds every means of diagnosis, whether general or local, insufficient to enable him to come to a positive conclusion. It is, therefore, of the greatest consequence to attend to the *symptoms* as well as the *signs* of these diseases; and on this subject much valuable information will be obtained from the works already referred to. Corvisart lays much stress on the appearance of the *countenance*, con-

Kreysig, devotes a whole chapter to this subject, considers suicide
a rare result of the intolerable misery entailed by organic lesions of th
one must have witnessed the frequent coexistence of this state of mi
affections; but in many cases, I am well assured that it is not essenti
upon these, but upon a state of bodily disorder which frequently exi
accompanying disease of the heart;—I mean, that complex and ill
order, commonly termed hypochondriasis. And, indeed, I am convi
rience that the disease of the heart itself is often the consequence o
This is also the opinion of Testa; who even goes so far as to consi
incurable cases of hysteria and hypochondriasis, as conjoined with inc
of the heart. (vol. ii. p. 69.) Another class of symptoms, hardly
Laennec, but highly deserving the attention of practitioners, are tho
disordered or diseased stomach. Corvisart, Kreysig, and particularl
this state of the stomach at some length; but none of these authors c
highly important etiological relations, and its still more important
treatment of the cases in which it occurs. Gastric irritation—cereb
cardiac irritation, constitute, in many cases, such a strong chain of dise
of which influences and strengthens every other part, that no plan of
does not embrace the whole, can be attended with success.—Hæmo
very common, and a very important symptom in diseases of the heart
deserving the attention of practitioners, as at once a sign of the di
danger to other organs, and a natural indication of the proper treat
and after him Kreysig, considers pains in other parts of the body r
heart, as a symptom of disease in this organ, especially of chronic i
it. Such pains no doubt exist; but I do not consider them as at all
affections.—The *position* assumed by patients in bed is an importa
diseased heart, although no one position is invariably associated eithe
eases in the organ in general, or with any of the forms of these. I h
verified the truth of a remark of Kreysig's, (Sect. III. chap. vii.) th
tion of a posture previously intolerable, is a sign of extremely bad o
epilepsy and apoplexy, are not unusual in diseases of the heart; an
is too frequently their closing symptom. The character of the *synco*
diseases of the heart, is well described by Kreysig, Sect. III. chap. i
Dr. Parry's work on *Angina*; and its frequency is sufficiently illustra
of its having been adopted by the last-mentioned author as the na
considered to be a particular disease, but which is now known to be
various diseases of the heart.—I have myself met with several cases
apparently depending on disease of the heart, and numerous cases o
are recorded by authors. Among others, I refer the reader to the wor
Lancisi, Morgagni, Greding, Testa, &c. and particularly to an inaugu

SECT. II.—*Of the Changes produced by Diseases of the Heart in the texture of other organs.*

On examining the bodies of persons who have fallen victims to organic affections of the heart, besides the structural lesions and the serous effusions which almost always accompany these, we find all the marks of congestion of blood in the internal capillaries. The mucous membranes, especially those of the stomach and intestines, are of a red or purplish tint; and the liver,

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1618. Albertini (Annibal) De affectionibus cordis Libri tres. *Venet.* 4to.
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1755--6—9. Meckel (J. F.) Obs. sur les maladies du cœur (Mem. de l'Acad. de Berlin.)
1761. Matanus (Ant.) De aneurysmaticis Præcordiorum morbis. *Liburn.* 4to.
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1792—5. Ferriar (J., *M.D.*) On Dilatation of the Heart (Med. His. and Reflect. vol. i. ii.) *Lond.* 8vo.
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lungs, and capillaries situated beneath the serous, mucous and cutaneous tissues, are gorged with blood. The augmented colour of the mucous membranes varies much in degree and extent. Sometimes it is observed only here and there, under the form of small points or specks, disseminated over the surface of the membrane: at other times it occupies the whole extent of the surface, and has the appearance of being attended with some swelling of the part. These two appearances are sometimes so considerable, that, if we looked to them merely, without examining the condition of the heart, and without reference to the his-

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1830. Bouillaud. Dict. de Méd. et Chir. Pr. (Art. *Cœur.*) t. v. *Par.*
1830. Elliotson, (John, *M.D*) On the recent improvements in distinguishing diseases of the Heart. *Lond.* Fol.
1832. Hope (Jas., *M.D.*) Treatise on diseases of the Heart, &c. *Lond.* 8vo.

tory of the patient, (who had perhaps been found capable of taking into his stomach wine and other stimulant matters without experiencing any pain, even up to the period of his death,) we might be tempted to believe that the fatal disease had been a violent inflammation of the stomach and bowels. In fact, the degree of redness of these membranes observed after diseases of the heart, is often much more intense and extensive than is found after true inflammation of these parts, as, for example, in dysentery; a fact, among many others, sufficiently proving the insufficiency of mere redness to characterize inflammation of the mucous membrane of the intestines, any more than the purple colour of the face in asthmatic patients is an erysipelas. In persons who have died of disease of the heart, particularly dilatation of the ventricles, we find more frequently than in other cases, that intense redness of the inner membrane of the heart and large vessels, which I shall hereafter notice when treating of the diseases of the aorta.

Lancisi and Senac, after Hildanus, consider gangrene of the limbs as a consequence of disease of the heart and large vessels. The late M. Giraud was of the same opinion; and, since his time, many practitioners have considered the gangrene of old persons as usually caused by ossification of the arteries. M. Corvisart justly doubts whether, in such cases, there is any thing else but mere coincidence of independent diseases; and I think that the single circumstance of the rareness of the spontaneous gangrene of the limbs, compared with the frequency of disease of the heart and ossification of the arteries, is sufficient to render the thing quite improbable.* This is equally the case with the notion of Testa, that ophthalmia, and sometimes the loss of the eye, may be ranged among the consequences of diseases of the heart.

None of the symptoms or effects mentioned, suffice to characterize or indicate disease of the heart, since they are common to many other affections, and particularly to almost every chronic

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* Testa (tom. iii. p. 333) and Kreysig (sect. iii. chap. vii.) are of the same opinion as Laennec: yet the following extract from Dr. Carswell's admirable Treatise on *Mortification*, published in the third vol. of the Cyclopædia of Practical Medicine, sufficiently proves that the ancient opinion, as far, at least, as it regards disease of the *Arteries*, is the true one. " In every case of gangrena senilis which I have examined after death," says Dr. Carswell, " I have found the arteries of the diseased limb obliterated in such a degree as to interrupt the circulation of the blood. The obstructing cause consisted, in five or six cases, of a fibrous tissue formed either in the walls or cavities of the arteries, whereby these vessels were converted into nearly solid cords of ligamentous consistence. This state we have traced from the toes more than half way up the leg: it was always connected with ossification of the larger branches and trunks of the thigh and other parts of the body. In the other two cases, the obstruction depended on extensive ossification of the principal arteries of the limb; and in several others it was produced by solid fibrine formed around spiculi of bone projecting from the internal surface of the arteries."—It is equally clear from the above extract, that the local gangrene cannot be regarded as any sign or proof of disease of the heart.—*Transl.*

always the case in hospital practice, we may someti
mere nervous palpitations for hypertrophy or dilat
heart. I have myself never fallen into this error
covering it after a certain time; but it may be of long
if we only examine our patients after long interva
more, if we do not do so during a state of repose.
much more insidious cause of error, is supplied by th
of the lungs which lessen the extent of respiration; s
monia, emphysema in a high degree, and, most of
pleurisy. In cases of this kind, I have sometimes fou
enormously dilated or thickened on examining the
death, although during life, the contractions of this
been perfectly natural in respect of sound, impulse an
would appear as if the diminished action of the lungs
heart to modify its action. I have already related so
of this fact, (see Cases V. VI. VIII. XXIV.) The
are by no means common, and cannot be estimated,
hospital, at more than one in twenty. In private
mistake in question must be much more rare, since
we almost always obtain more information respecting
health of the patients even than we require.

SECT. III.—*Of the Causes of Diseases of the*

The causes of diseases of the heart are, like the dis
selves, various in their nature. Ossifications are th
some abberration of the process of assimilation which
understood. Corvisart inclined to the opinion that
cences on the valves originate in a syphilitic taint. I

to perform, in order to propel the blood into the lungs against the resistance opposed to it by the cause of the dyspnœa. It is in this manner that phthisis pulmonalis, empyema, chronic pneumonia, and emphysema of the lungs, act in producing disease of the heart; and that those kinds of exercise which require great exertion, and thereby impede respiration, come to be the most common remote causes of these complaints. On the other hand, it is found that diseases of the heart, on the same principle of mutual influence, give rise to several diseases of the lungs. They are thus amongst the most frequent causes of œdema of the lungs, hæmoptysis, and pulmonary apoplexy. When, however, diseases of the heart are found to co-exist with chronic pleurisy, phthisis, emphysema, and, in general, with chronic disease of the lungs, it will usually be found, on close examination, that the latter are the primary diseases. It follows from these, and other facts noticed under the head of emphysema and pulmonary catarrh, that a *neglected cold* is frequently the original cause of the most severe diseases of the heart. To all these causes must be added the congenital disproportion between the size of the heart and the diameter of the aorta. M. Corvisart has, perhaps, gone too far in asserting that there can be no dilatation of the heart without the previous existence of a disproportion of this kind, or of a contraction, or some similar obstruction to the circulation, at a greater or less distance from the heart; it is, however, true, that it is very common to find an aorta of small diameter in cases of hypertrophy or dilatation. Still, this is not always the case, and however rational such a cause may be, we can readily conceive many others. We know that the energetic and reiterated action of all muscles materially increases their size, as in the case of those of the right arm of the fencer, the shoulder of the porter, and the hands of most artizans. On the same principle we must admit that even nervous palpitations, or such as originate from moral causes, may, by frequent recurrence, produce a true enlargement of the heart.

There is yet another congenital cause of disease of the heart, which appears to me to be of greater frequency than the small calibre of the aorta, above mentioned,—I allude to a disproportionate thickness of one or both sides of that organ. I am satisfied that in a great many persons the parietes of one or both sides of the heart are either too thick or too thin from birth. In such cases there can be no doubt that the usual exciting causes, moral and physical, will be more apt to produce formal disease of the heart than in individuals in whom this disproportion does not exist.*

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* M. Laennec's account of the *causes* of diseases of the heart, is as meagre as his detail of the general symptoms. On this subject also, some of the authors already quoted, and particularly Testa and Kreysig, have written much at length, and are

CHAPTER II.

OF HYPERTROPHY OF THE HEART.

By hypertrophy, I mean simple increase of the muscular substance of the heart, without a proportionate dilatation of [illegible]

well deserving the student's attention. I shall here briefly advert to some of the principal causes overlooked or not sufficiently noticed by our author.

Moral causes.—These are considered by Corvisart, Testa and Kreysig, as, either immediately or remotely, the most powerful and frequent causes of diseases of the heart. Many well-known instances of sudden death from mental emotion—and particularly from excessive joy—through rupture, spasm, or palsy of the heart, are on record. Permanent lesions arise from similar causes. I had lately under my care a poor woman with organic disease of the heart, of many months' standing, which was produced by horror at seeing her infant scalded to death. Both Corvisart (p. [illegible]) and Testa (t. i. p. 10) assert that diseases of the heart have been more frequent in consequence of the tremendous agitation produced by the French Revolution and its consequences. This, however, is doubted by Bertin, (p. 350,) who thinks the seeming increase of such cases is rather owing to their being better understood and more certainly recognized. A long continuance of the depressing passions may act in various ways in giving rise to these diseases,—e. g. in directly exciting palpitation, or debilitating the muscles of the heart, in producing disorder and disease in other organs, which may act indirectly or directly on the heart, &c. However they act, their influence must be admitted by every practitioner of experience. See, for example, Case IX. in my work entitled "Original Cases," p. 138.

The strumous habit.—This is considered by Testa as affording a strong predisposition to disease of the heart; my own experience leads me to the same conclusion. In this case I have thought that the disease is developed at a more early age than under other circumstances. Perhaps in this case an original disproportion of parts usually exists.

Disease of other organs.—Besides diseases of the lungs, noticed by our author, diseases of other organs are justly considered as a cause of affections of the heart. Enlargement of the liver, so commonly observed in such cases, is considered by Corvisart, as always the effect of the disease of the heart. Testa considers it as occasionally a cause. Most probably it may be merely a concomitant, and the consequence of those chronic disorders of the stomach and upper bowels, which are too frequent in all classes of persons, to be safely admitted as either a common cause or effect of affections of the heart. This and other obstructions of the abdominal viscera and other parts remote from the heart, have been moreover supposed to act directly in producing disease of the heart, partly by compressing the large vessels in their vicinity, and partly by blocking up the capillaries within their substance. See on this subject Kreysig (sect. ii. cap. iii.) and also the paper of Mr. James in the Med. Chir. Trans. vol. viii.

Hereditary causes.—There can be no doubt that diseases of the heart are very frequently hereditary, although the character in which the predisposition consists may be very various in different cases. Some striking instances of this fact are recorded by Lancisi, Albertini, Morgagni, Portal, &c.; and Corvisart, (p. 370,) and Testa (t. i. p. 17,) are strong supporters of the same opinion. A striking instance of this kind is recorded in the Med. Comment. vol. ix. p. 307; and my own practice, as well as that of most practitioners of experience, would enable me to add many to the catalogue.

Cutaneous diseases.—We are too little in the habit, in this country, of adverting to the ancient doctrines of *repulsion* as a cause of internal disease. There can, however, be no doubt of their truth; and this, I believe, is as conspicuous in the case of diseases of the heart, as in any other. The foreign writers are perhaps as much disposed to overrate as we are to underrate the influence of this class of causes. [illegible] cavities: on the contrary, these are most commonly considerably diminished in size. This affection is by no means common, and

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many cases of cardiac disease supposed to originate in the repulsion of cutaneous eruptions I refer the reader to the works of Testa, (t. i. p. 119,) and Kreysig, (sect. ii. cap. iii.) The last-named author considers the *membranes* of the heart, both external and internal, to be the parts chiefly affected in such cases, a circumstance which he attributes to similarity of texture; and he states, moreover, that in certain febrile eruptive diseases, particularly measles and scarlatina, he has found these membranes simultaneously inflamed with the skin.

Syphilis.—The opinion of Corvisart alluded to in the text, and which is that of many other writers, particularly foreign, respecting the syphilitic origin of certain affections of the valves, seems extremely doubtful, if not improbable. M. Bertin states that an experience of twenty years, at the venereal hospital, has led him to consider the influence of this cause as greatly exaggerated, (p. 232.)

Gout.—It hardly admits of doubt, that gout is not unfrequently an exciting cause of organic lesions of the heart; and it is probable that it may occasionally affect this organ directly, and thereby produce death, or symptoms resembling those of angina pectoris. Kreysig is a strong advocate of this opinion, (sect. i. c. 3,) which is, moreover, corroborated not merely by the peculiar characters and origin of gout, but by the testimony of most writers, and, indeed, by the experience of most practitioners. Dr. Scudamore in his work on Gout, (4th ed.) gives a remarkable case (p. 44) of palpitation of the heart which had lasted three years, and which disappeared the very day on which an attack of articular gout came on; and the same author quotes a similar case from Dr. Baillie, (p. 16,) which had continued six months, unrelieved by medicine, but was instantly removed on the supervention of gout. Many similar cases might be mentioned. I consider gout, or rather that modification of the general system usually termed the *gouty habit*, as by much the most frequent cause of disease of the heart in advanced life; and we need look no further than to the plethora, the altered condition of the blood, and the tendency to morbid secretion, which characterise this state, to see a ready and rational explanation of the fact.

Rheumatism.—The effect of rheumatism in occasioning disease of the heart is still more evident than that of gout, and is universally admitted in this country. It is singular, however, that this cause is very little noticed by the best foreign writers on diseases of this organ. In this country we possess several excellent memoirs on the subject, particularly those of Sir David Dundas, Dr. Wells, Dr. Cox, and Dr. Hawkins, besides numerous cases scattered through our periodical journals. Indeed every practitioner of experience must have met with instances of the kind. I have myself had occasion to see many besides those recorded in my "Original Cases." (See Case VI. p. 112, and Case XII. p. 165, in that work.) It would appear from the result of the dissections that have been made, that the most common effect of the metastasis of rheumatism to the heart is *pericarditis*, presenting all the ordinary symptoms of that disease. This affection frequently proves fatal in the acute stage: sometimes it is cured; but commonly, when not proving fatal, it is found to produce enlargement of the heart; and in this case the original character of the disease is discovered after death, by the presence of adhesions between the heart and pericardium. Sometimes, however, it would seem that the muscular substance of the organ is alone affected, and the consequence of the attack is one or other of the forms of hypertrophy or dilatation. For instances of acute pericarditis succeeding rheumatism, the reader is referred to the fifth case of Dr. Wells, Dr. Davis's cases of Carditis, some of Dr. Cox's cases, and two referred to by Dr. Hawkins, at p. 100 of his work.

Although rheumatism, strictly so called, is no doubt the frequent source of organic diseases of the heart, I have been led by my own observation to consider these diseases as frequently originating in common idiopathic inflammation of some part of this organ. At least I have met with many cases of organic disease of the heart, which supervened to acute attacks of what I considered inflammatory affections of the heart or its membranes, unpreceded and unaccompanied by any symptom of rheumatism. See, for instance, Cases II. p. 92, and III. p. 96, in "Original Cases." I observe that the same opinion is entertained by Andral in his recent work—see tom. iii. p. 459. This author has some excellent observations on this subject. He considers the inflammations which precede hypertrophy, to be commonly situated either in the pericardium, or in the inner membrane of the heart or aorta, and explains, or at least

When affecting the left ventricle, I have seen its
than an inch, or even eighteen lines thick at the
is, double or triple their size in the sound state.
this morbid thickening diminishes insensibly from the
apex of the ventricle, where it is scarcely perceptible;
however, the apex partakes in the enlargement; as I
from two to four lines thick, which is double or qu
natural size. The columnæ carneæ of the ventric
pillars of the valves, acquire a proportionate enlargem
septum between the two ventricles becomes also c
thickened in the disease of the left ventricle, (which fa
mark it as belonging to this rather than the other ven
in general not so much so as the other parts. There
ever, exceptions, as we find, (and this has been well re
M. Bertin) that the hypertrophy is sometimes uneq
part of the ventricles, or occupies only a single point,
apex or middle, the septum or loose part, the external
fleshy columns. The muscular substance in these c
degree of consistence sometimes double the natural,

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illustrates their *modus operandi*, in a very ingenious manner. (Op. Ci
Burns appears to consider inflammation of the heart or pericardium
quence, rather than the cause, of the enlargement of the organ. (Op.
is more than probable, that in some of his cases, at least, he mistook
the cause; although it certainly seems reasonable to believe that hyp
heart may give rise to inflammation of the pericardium.

Congenital disproportion of parts of the heart.—This I consider with
the most frequent cause of all, at least, in early life, and as the source
diseases, even before it can be said to amount to formal disease of the
valuable chapter on this subject in Testa (tom. ii. cap. ii.) to which r
to have been made by our author.—*Transl.*

* M. Bertin, in his *Traité des Maladies du Cœur et des gros Vaisseau*

a redder colour. The cavity of the ventricle appears frequently to have lost in capacity what its walls have gained in thickness. Sometimes I have found this so small, in hearts twice the size of the fist of the individual, as scarcely to be capable of containing an almond in its shell. The right ventricle in such cases, being proportionably smaller as the hypertrophy of the other is great, lies flattened along the septum, and does not extend to the apex of the heart. In extreme cases, it seems as if it were merely included within the walls of the left ventricle.

In hypertrophy of the right ventricle the appearances are somewhat different. The thickening is here more uniform, and never so great as in the other: I have never found this greater than four or five lines; M. Bertin, however, (Op. Cit. Obs. lxvii.) found it from eleven to sixteen lines, in a case where the foramen ovale was still open; and M. Louis has described a similar case in the *Archives de Médecine* for December, 1823. It is always a little greater in the vicinity of the tricuspid valves, and at the origin of the pulmonary artery. The columnæ carneæ are much enlarged, considerably more so, in proportion, than those of the left, in disease of that side; and this circumstance, together with the increased firmness of the texture, is what seems, at first sight, most remarkable in the appearance of the parts.*

Signs of hypertrophy of the left ventricle.—It is to this variety of the disease, especially, that the symptoms attributed by M. Corvisart to *active aneurism* of the heart, must be referred; and, indeed, in a general point of view, and speaking with a degree of accuracy which would suffice in a book of nosology, like that of Sauvages or Cullen, we may state that, besides those common to all diseases of the heart,† the symptoms of the hypertrophy of the left ventricle are the following:—a strong full pulse, strong and obvious pulsation of the heart, perceived as well by the patient, as by applying the hand, absence or diminution of the sound afforded by percussion on the region of the heart, and a tint of

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* Bertin's account of hypertrophy, and, I may add, of all the other affections of the heart, is excellent. He divides hypertrophy into three species, according as the natural capacity of the cavity is augmented, diminished, or remains unaltered, and terms them, respectively, *eccentric*, *concentric*, or *simple* hypertrophy. I give the preference, however, with Dr. Hope, to the old nomenclature, and regard the classification of this gentleman as the best. It will be seen that he notices one variety of the disease not named by Laennec. The following is Dr. Hope's arrangement:—

1. *Simple hypertrophy.*—The walls thickened, the cavity retaining its natural dimensions.

2. *Hypertrophy with dilatation.*—The walls either thickened or not diminished, the cavity enlarged.
    a. The walls thickened, the cavity dilated.
    b. The walls of natural thickness, the cavity dilated.

3. *Hypertrophy with contraction.*—The walls thickened, the cavity diminished.—*Transl.*

† Bertin (Op. Cit. p. 359) very justly insists upon a striking difference in the symptoms of simple hypertrophy, in a moderate degree, and those of other diseases of the heart. In this case he truly states, that there is often rather an increased energy of the functions of health, than any marked derangement of these.—*Transl.*

certainly preferable means of exploration, but even
inapplicable in many cases, particularly in cases of
obesity or anasarca. Mediate auscultation furnishes
are much more constant and positive. The contrac
left ventricle, examined between the cartilages of th
sixth ribs, gives a very strong impulse, sufficient to
observer's head, and is accompanied by a duller
natural; it is more prolonged in proportion as the th
more considerable. The contraction of the auricle is
productive of little sound, and, consequently, scarcely
in extreme cases. The sound of the pulsation of the
fined to a small extent, being, in general, scarcely
under the left clavicle, or at the top of the sternum;
it is confined to the point between the cartilages of th
seventh ribs. The impulse of the heart is rarely p
yond the same limits, except during palpitation.

In this disease the patient experiences, more cons
in any other, the sensation of the action of the heart
less subject to violent attacks of palpitation, except
dental causes, such as moral affections and violent bod
In this case, during the palpitations, irregularity and

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* This view of the state of the pulse in hypertrophy of the left ven
definite. The following observations by Dr. Hope are deserving the
reader. "The pulse in hypertrophy of the left ventricle undergoes
and other lesions, a variety of modifications which disguise its real na
therefore, be studied in cases totally exempt from complication. In
invariably regular and bears strict relation, in strength and size, to th
capacity of the left ventricle. Thus, in simple hypertrophy, it is stro
more tense than natural; it swells gradually and powerfully, expands
long under the finger, and is sometimes accompanied with a thril
These characters are still more marked in hypertrophy with dilatatio
hypertrophy is predominant; but when the dilatation has

of the pulse are uncommon: there is rather increase of the power of the ventricles than of the noise produced by their action. Sometimes, however, I have thought that certain habitual irregularities of the pulse and heart, in subjects who, in other respects, had only slight marks of hypertrophy, were owing to the partial thickenings already mentioned, and which have received particular attention from M. Bertin. Simple hypertrophy of the left ventricle is, of all the affections of the heart, that which most frequently gives occasion to apoplexy. In M. Bertin's work, several remarkable instances of this result are recorded (Obs. lxxiv.—lxxx.); and the attention of practitioners has been more particularly called to it by MM. Legallois and Richerand. Corvisart considered this result as rarer than it really is.*

Signs of hypertrophy of the right ventricle.—In this case, according to M. Corvisart, the symptoms are the same as when the disease is on the other side, only that the respiration is more oppressed, and the colour of the face is deeper.† He adds that, "the pulsations of the heart, which are most evident on the right side, may also be considered as signs of the dilatation of the right ventricle; but . . . . this sign, taken by itself, is of little value." (Op. Cit. p. 149.) He might have added, that we cannot, by means of the hand, perceive the action of the heart on the right side, except in cases where this organ is displaced by an effusion or tumour in the left side of the chest. Lancisi has mentioned the swelling of the external jugular veins, with a pulsation analogous to that of an artery, as a sign of the aneurism of the right ventricle. M. Corvisart has rejected this symptom, because he says, "it has been found in cases where the left side of the heart was dilated, and because the pulsation may be confounded with that of the carotids." In this opinion I differ from M. Corvisart. I have uniformly found this symptom in every case of this kind, of any degree of severity; and I have never met with it in hypertrophy of the left ventricle, unless there existed, at the same time, a similar affection of the right. One must be very inattentive, or have never witnessed these pulsations of the jugulars, to confound them with movements occasioned by the pulsation of the carotids. It is likewise worthy of notice, that this pulsation of the jugulars is commonly confined to their inferior portion, where the vein and artery lie much further asunder than in the middle of the throat. Sometimes, however, this reflux of the blood extends wider, and even beyond the jugulars. Hunauld has seen it very perceptible in the superficial veins of the arm.* I myself saw a similar case last year; and in a large vein of the size of a goose-quill, which joined the jugular, I also observed very distinctly a pulsation isochronous with the pulse. I would, therefore, be disposed to regard this symptom as one which ought to lead us to suspect the existence of the thickening of the right ventricle.†

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* For some ingenious arguments against the doctrine, of apoplexy being a consequence of hypertrophy of the left ventricle, I refer the reader to a very valuable and interesting paper by Dr. Kellie in vol. i. of the Edin. Med. Chir. Trans. p. 123. No argument, however, can rebut the evidence of such facts as have been adduced in support of the doctrine by Bertin and many others. I have myself seen a good many instances of the kind. See "Original Cases" III. and VII.—The following remarks of Dr. Hope are in accordance with my own observation. "The patient complains of a *rushing of blood to the head* on making any corporeal effort or stooping; of intense throbbing and lancinating head-aches, aggravated by the recumbent position, and especially by the act either of suddenly lying down or rising up; he complains also of vertigo, tinnitus aurium, scintillations and other visual illusions; and sometimes of a lethargic somnolency which so completely subdues the faculties both of the mind and the body, as utterly to incapacitate him for every species of exertion. These symptoms, if not relieved, terminate in palsy or apoplexy. From this catastrophe the patient is often preserved by epistaxis to which, happily, he is peculiarly liable." (Cyc. of Pract. Med. *Ibid.*)—*Transl.*

† The following remarks of Dr. Hope respecting the state of the complexion in hypertrophy are ingenious, and on the whole accord with my own observation. "The effect of hypertrophy is to heighten the colour so long as the capillary circulation continues unembarrassed, but afterwards to diminish and change it. Every individual, however, does not acquire a florid colour. Whether he acquire it or not, depends, in truth, upon the original complexion, the series of changes being different in those who are naturally florid and those who are pale. In the former, the colour becomes remarkably vivid, and being generally accompanied with plethoric turgescence, it gives the aspect of health and good condition. But when the capillary circulation begins to labour, the red changes into a purplish patch on the cheeks, the nose and lips become more or less purple, violet, or livid, and the intermediate skin becomes sallow and cachetic. In great hypertrophy with dilatation, the purple and violet colours are sometimes of the deepest dye..... In those who are naturally devoid of colour, hypertrophy either does not excite it at all, or merely increases, in a slight degree, the general vascularity of the face. This vanishes entirely when the capillaries become obstructed, and is superseded by universal cadaverous paleness, extending sometimes even to the lips. They, however, are generally somewhat livid." (Cyc. of Pract. Med. *Ibid.*)—*Transl.*

The contractions of the heart, as explored by the stethoscope, give the same results precisely, whether the hypertrophy be on the right or left side: only, in the former case, the shock of the heart's action is greater at the bottom of the sternum than between the cartilages of the fifth and seventh ribs, which is the reverse of what happens when the disease is in the left side of the organ. In most men, in health, the heart is heard equally in both these places. In those who have no mark of diseased heart, however, we sometimes hear the sounds better under the sternum than the cartilages; and I am disposed to consider this as constantly indicating a marked predisposition to hypertrophy or dilatation of the right ventricle.

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* [illegible] Acad. des Sc.

† [illegible] says this state of the jugulars is not observed except in the case [illegible] as well as hypertrophied, and when the auriculo-ven- [illegible] large. [illegible] (t. iii. p. 321) disbelieves the frequency of this sign; but Dr. Hope regards it as one of the best general signs of hypertrophy of the right ventricle, more especially when accompanied with dilatation. The following [illegible] by Dr. Hope, on the differences between this condition of the jugulars and [illegible] of the carotids are worthy of notice. "The jugular pulsation is [illegible] occasioned by the auricular systole, preceding that occasioned by the ventricular systole. . . The jugular pulsation is confined to the lower part of the neck, and is far on the humeral side of the carotid. The pulsations of the artery, on the contrary, extend as high as the angle of the jaw, and in the direction of the anterior margin of the mastoid muscle. The jugular turgescence, again, disappears in some degree, during inspiration, and re-appears in expiration, which movements, therefore, must not be confounded with the pulsations answering to the systole of the ventricle." (*Ibid.*)—*Transl.*

I consider this sign drawn from the place where the heart is heard and felt beating with the most force, as altogether certain. I have proved its truth so often by dissection, that I look upon it as infallible when well-marked. A very interesting case will be detailed under the head of *ossification of the valves*, which, although devoid of the absolute certainty supplied by dissection, will, I conceive, afford incontestible proofs of this fact. Nevertheless, there is still one exception to this rule. When the left ventricle has acquired an enormous size from hypertrophy and dilatation, and the right still remains small, the former becomes quite anterior and the last posterior: in this case, the pulsations of the left ventricle are perceived much better under the sternum, than in the left precordial region, while those of the right are not perceived at all. We may, however, ascertain the truth in this case, by observing that there is no reflux of blood in the veins. Simple hypertrophy without dilatation is much more rare in the right than in the left ventricle.*

In *Hypertrophy of both ventricles at the same time*, the enlargement extends on both sides to the apex of the heart, and the anatomical characters already mentioned co-exist. The signs of this affection consist in the re-union of those that belong to hypertrophy of each side; only those of the right side are almost always more marked.

CHAPTER III.

OF DILATATION OF THE VENTRICLES.

Anatomical characters.—This disease of the heart, which has been named *passive aneurism* by M. Corvisart, consists in dilatation of the cavities of the ventricles, with decreased thickness of their walls. With these conditions there are commonly conjoined a marked degree of softening of the muscular substance, and a colour more purple or paler than natural. Sometimes the softness is so considerable, especially in the left ventricle, that

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* Hypertrophy of the right ventricle appears to exert the same influence over the lungs as the left does over the brain, predisposing to pulmonary apoplexy and hæmoptysis. Bertin and Bouillaud notice several cases of this sort, and wish to separate these active *arterial* hæmorrhages from the venous hæmorrhages, pulmonary or others, so common in the latter stage of all diseases of the heart. But I am of opi that there is more theory than actual observation in these distinctions.—(*M.L.*

[illegible] by mere pressure be- [illegible] the walls of the same ventricle may be so [illegible] two lines in the [illegible] at the apex, while the [illegible] extenuated, as to ap- [illegible] investing membrane. [illegible] ventricle, are more [illegible] parts. The septum [illegible] and of its con- [illegible]

[illegible] although it more [illegible] and this is the more [illegible] takes place in hyper- [illegible] affected, the apex [illegible] so remarkable a degree [illegible] of the cavity [illegible] This is particularly [illegible] at the same time: [illegible] shape, being nearly [illegible]

[illegible] carried so far as to [illegible] This seems possible; and the [illegible] of softening of the [illegible] We must not [illegible] of the cavities, depending [illegible] last moments of life [illegible] to prevent such a [illegible] upon cutting into [illegible] the cavities are laid [illegible]

[illegible] the heart is always [illegible] of the blood, such as [illegible] of the aorta and [illegible] employments which [illegible] lungs. The effects [illegible] I am of opinion that the [illegible] disproportion of the [illegible] common in women, who [illegible] ventricles thinner than [illegible]*

[illegible] causes of dilatation, and particularly [illegible] "The exciting causes of [illegible] congenital or acquired, in [illegible] obstructions to the circulation [illegible] from the aortic or pulmonary system. [illegible] same as the exciting causes of [illegible] the resistance of the muscle [illegible] or the other is produced. [illegible] cavities with naturally thick walls. [illegible] hypertrophy, it must be ascribed either to

Signs of the dilatation of the left ventricle.—The symptoms of this affection, according to Corvisart, are—"a soft and weak pulse, and feeble and indistinct palpitations:—the hand applied to the region of the heart feels as if a soft body elevated the ribs, and did not strike these with a sharp and distinct stroke. It appears as if we could diminish the palpitation by strong pressure." (Op. Cit. p. 147.) I formerly stated my opinion respecting the pulse as a sign of disease of the heart; and in respect to the information to be obtained by the application of the hand, I must say that in most cases I have not found the action of the heart at all perceptible in this way. In like manner I have frequently found the sound on percussion pretty good in cases of considerable dilatation. The only certain sign of the existence of this disease is that given by the stethoscope, viz. the clear and sonorous contractions of the heart between the cartilages of the fifth and seventh ribs. The degree of distinctness of the sound, and its extent over the chest, are the measure of the dilatation: thus,—when the sound of the contraction of the ventricles is as clear as that of the contraction of the auricle, and if it is, at the same time, perceptible on the right side of the back, the dilatation is extreme.

Signs of the dilatation of the right ventricle.—According to M. Corvisart the state of the pulse, and the pulsation of the heart, are very nearly the same as in dilatation of the left ventricle, only that the action of the heart is heard somewhat better towards the bottom of the sternum and epigastrium, than in the

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a congenital disproportion of the heart, in consequence of which the cavity in question is thinner and therefore more disposed to dilatation than natural; or it must be attributed to the obstruction, from its nature or situation, bearing more in proportion on that particular cavity than on any other. It is from having overlooked these considerations respecting the relations of the resisting and distending forces to each other, that some have excluded dilatation from the catalogue of mechanical diseases, and supposed that it takes its rise in any cavity of the heart either by chance or by some vital predilection—some vague, unintelligible predisposition." (Cyc. of Pract. Med. Art. *Dilatation*, vol. i.)

M. Bertin divides dilatation as well as hypertrophy into three species—viz. according as the walls of the dilated cavity are thicker or thinner than natural, or still retain their natural thickness. The first of these is that noticed by him under the former head, and termed *excentric hypertrophy*. He says a fourth variety may be added, namely, where the walls of the affected cavity are thickened in some parts, extenuated in some, and of the natural thickness in others. This author admits that the muscular substance may be softened and discoloured in dilatation, but he considers these states as mere complications, and not essential to constitute the disease. Of the two classes of enlargement of the heart, he wishes the first to be exclusively distinguished by an increased thickness of the walls, and the second by an increased capacity of the cavities. One of the species of dilatation, that, namely, in which the walls of the enlarged cavity retain their natural thickness, is supposed by M. Bertin, not to have been formerly noticed before the publication of his work. In this he is mistaken, however, as it was noticed both by Burns and Kreysig. M. Bertin terms it *simple dilatation*; and states it to be of almost as frequent occurrence as the excentric hypertrophy, or hypertrophy with dilatation. It is well observed by this author, that the orifices of the heart frequently partake in the dilatation of the cavities, insomuch that the valves become insufficient to close them.—*Transl.*

has appeared to me the most constant and character
equivocal signs of this affection. This condition of t
is not removed by compression of the veins at the u
the neck. In respect of the signs furnished by percus
frequently found the right cavities very much dilated
whose chests sounded very well in the cardiac region
the sternum; and, generally speaking, it has appe
that the disease which most frequently gives occasion
of sound, is not that now under consideration, but h
with dilatation. Corvisart's observation respecting
degree of lividity of the face in dilatation of the heart
manner, perhaps, not quite correct. It is, no doubt
observes, that this colour is deeper in dilatation c
than of the left cavities, and the same may be said o
of the extremities: nevertheless, I have frequently se
tenance very pale and of a dirty yellow, and the lips
of the natural degree of colour, in dilatation of the he
on the other hand, hypertrophy with dilatation of th
has appeared to me to be the affection most frequent
with intense lividity of the face and extremities, great
frequent or severe hæmoptysis, and extensive anasarc

The only constant and truly pathognomonic sign c
of the right ventricle, is the loud sound of the hear
under the lower part of the sternum, and between th
of the fifth and seventh ribs of the right side. Th
dilatation is measured by the extent of the sound c
over the chest, and according to the scale of progressi
mentioned.† The palpitations which accompany th

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[*] With the more important general signs or effects of dilatation of
serous infiltration, discolouration of the face, congestion of the

consist, principally, in an increase of the frequency and sound of the contractions, while, at the time, the impulse of the heart's action is frequently feebler than in the ordinary state of the patient. Irregularity of the action of the heart as to force and frequency, and the intermission of pulse attending these, are unusual, although more common than in hypertrophy.*

CHAPTER IV.

OF DILATATION WITH HYPERTROPHY OF THE VENTRICLES.

The re-union of these two states, which constitutes the *active aneurism* of M. Corvisart, is extremely common; much more common than simple dilatation, and still more so than hypertrophy without dilatation. This complication may exist in one or both ventricles. In the latter case, the heart acquires a prodigious size, sometimes more than triple that of the hand of the individual. The augmentation of volume is here the effect of thickening of the walls of the ventricles and proportional enlargement of their cavities. Their muscular substance also usually acquires a greater degree of solidity. The apex of the heart becomes blunter, but this is rarely so great as to give to the organ the rounded form noticed in the case of simple dilatation. In a middling degree of the affection, the ventricles are dilated, and their walls seem only not to be thinner than natural, or there is evident hypertrophy of the walls without diminution of the cavities. In some rare examples, different portions of the parietes of the same ventricle, exhibit the character of hyper-

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seemed confined within the mediastinal cavity. The sound was further obscured from the co-existence of softening of the heart, and diseases of the lungs.—*Author.*

* Bertin makes an important observation respecting the symptoms attending dilatation of the heart, and which should always be kept in view. As this affection usually, if not always, results from some obstruction to the course of the blood, many of the symptoms attending the disease are the consequence of the primary obstruction rather than of the dilatation.—My own observation leads me to agree with M. Laennec in regarding the swollen state of the jugulars without pulsation, as a very frequent sign in dilatation of the right ventricle; and in this opinion I am joined by Dr. Hope (Loc. Cit. p. 602.)—Among many other equivocal symptoms of dilatation, I think that of pain or rather a feeling of distress in the region of the heart, and pain extending sometimes to the top of the sternum, between the shoulders, or left arm, deserve notice. These symptoms, when they recur in paroxysms, constitute a variety of *angina pectoris.* Among the many disorders of structure and function occasioned by dilatation of the heart, even when existing only in so slight a degree as not materially to interfere with the business of life, my attention has been particularly called to *head-ache ;* a disease which I think I can trace in a great number of cases to this condition of the heart, as its exciting cause. In instances of this kind, the impulse of the organ is feeble, but its sound is loud and audible over the greater part of the chest. This observation, if found generally correct, is of great practical importance. The rationale of the case is sufficiently obvious.—*Transl.*

trophy, and others that of dilatation, as has been truly observed by M. Bertin.

Signs.—The signs of this affection are a compound of those of hypertrophy and dilatation. The contractions of the ventricles yield, at the same time, a strong impulse and a very marked sound. Those of the auricles are also sonorous. The sound of the heart's action is heard over a great extent; and sometimes, particularly in thin subjects and children, even the shock is perceptible below the clavicles, on the sides, and even a little on the left side of the back. In the case of a woman, who laboured under this affection, I heard and felt the contraction of the ventricles at the lower part of the right back; and although this patient was of a small stature and middling strength, the impulse and sound, in the places mentioned, were greater than in the region of the heart in the case of a strong man in perfect health.*

In this affection, the contractions of the ventricles are very easily perceived by the hand; which (particularly during palpitation) is moreover forcibly raised by the sharp, definite, and violent pulsations. Even in the absence of palpitation, if we attentively observe the patient, we frequently perceive the head, limbs, and even the bed-clothes, strongly shaken at each contraction of the heart. The pulsations of the carotid, radial, and other superficial arteries are frequently visible. If we press on the region of the heart, this organ, according to the expression of Corvisart, "seems to be irritated by the pressure and beats more forcibly still." To these energetic contractions of the heart, according to this author, corresponds (when the disease affects the left ventricle) a pulse which is frequent, strong, hard, vibrating, and difficultly compressed. This state of pulse is, no doubt, frequently met with in hypertrophy with dilatation, as well as in simple hypertrophy of the left ventricle: I cannot, however, consider it with Corvisart, as a *sign* of the active aneurism of the left ventricle, inasmuch as we very frequently observe a small and feeble, although regular pulse, in subjects whose hearts are much enlarged and habitually violent in their action.

The palpitations which take place in this affection, present under the stethoscope the same characters as the habitual contractions in the same case, only in a more intense degree: they are seldom attended with irregularities, except on the approach of death. Sometimes, during these palpitations, besides the impulse of the heart, which seems communicated by a large surface, we can distinguish another which is sharper, clearer, and shorter, although occurring at the same time, and which seems to strike the walls of the chest with a much smaller surface. This blow seems evidently occasioned by the apex of the heart.

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* A singular case of pulsation in the right hypochondre, in a case of diseased heart, is recorded by Mr. Ward, in the *Med. and Phys. Journ.* No. 291; in which the pulsation was owing to the right lobe of the liver, enormously enlarged, extending into the chest, and coming in contact with the heart. Many of the cases of pulsation felt very remote from the heart, may be explained by the intervention of a conducting medium superior to that which naturally exists in these situations: although this result arises also from many other causes. See "Original Cases," p. 157—150.—*Transl.*

The examination of the actions of the heart first on the one side then on the other,—that is, under the lower part of the sternum and between the cartilages of the fifth and seventh ribs of the left side, enables us to ascertain precisely which of the ventricles is affected, if there is only one; or if they both are so, which is more commonly the case. Dilatation with hypertrophy, being of all the affections of the heart, that in which this organ attains the largest size, it is in this, accordingly, in which the absence of the natural sound on percussion of the cardiac region, is observed most frequently and most extensively.

CHAPTER V.

OF DILATATION OF ONE OF THE VENTRICLES WITH HYPERTROPHY OF THE OTHER.

This species of complication is by no means very rare, although it is more so than the preceding. Its signs are likewise a mixture of those of hypertrophy and dilatation, with predominance of the one or other, according to whichever exists in the greatest degree. The comparative exploration of the two sides of the heart is a certain means of ascertaining every complication of this kind that can take place. I have frequently met with the following varieties: 1. hypertrophy with dilatation of the left ventricle, and simple dilatation of the right; 2. hypertrophy with dilatation of the left ventricle, and simple hypertrophy of the right; 3. hypertrophy with dilatation of the right, and simple dilatation of the left; 4. simple hypertrophy of the right, with dilatation of the left: this last is the rarest. I do not remember to have met with dilatation of the right ventricle coinciding with simple hypertrophy (to a considerable degree) of the left; and I am even inclined to consider this complication as almost impossible, inasmuch as, in the case of great hypertrophy of the left ventricle, the right seems, as formerly observed, as if hollowed out of the walls of the other.*

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* The following synopsis extracted from Dr. Hope's work exhibits the various forms and combinations of hypertrophy and dilatation of the ventricles, and in the order of frequency of their occurrence:—1. Hypertrophy with dilatation of the left ventricle, and a less degree of the same on the right; 2. hypertrophy with dilatation of one ventricle, especially the left, with simple dilatation of the other; 3. simple dilatation of both ventricles; 4. simple hypertrophy of the left, and hypertrophy

Notwithstanding what has been above stated of the certainty of the evidence supplied by mediate auscultation in diseases of the heart, it must be admitted that it will always be those diseases respecting which we shall be most liable to commit grievous errors in diagnosis:—more especially if we restrict our exploration to a few minutes, and fail to take into account the general symptoms and diseases that may complicate those of the heart. For example, trusting to the stethoscope alone, if applied during a moment of nervous excitement, we might be led to conceive the existence of dilatation or hypertrophy, when the heart was perfectly sound: whilst, on the other hand, we might, under certain circumstances, fail to discover actual disease of the organ, although existing in a very high degree. I formerly took some notice of the cases in which such errors are possible; but I deem it proper to renew the consideration of the subject in this place, as such errors are at once of high importance and very easily fallen into.

Dilatation and hypertrophy of the heart, are in their essence mere defects of proportion between this organ and others, or between some of its own constituent parts; and a heart which, from its great size alone, is a cause of perpetual distress and eventually of death, would be productive of no inconvenience if it happened to be lodged in a thorax of somewhat larger capacity, and belonged to an individual whose lungs and capillaries were of a somewhat stronger texture. And, indeed, very few persons have the heart in exact and perfect proportion, either as to its individual parts relatively to one another, or in its relation to the size and strength of other organs. It is well known, that in this respect, there are few organs possessed of such variable proportions. Generally speaking, it is better that the heart should be rather small than large; but all those whose hearts are rather voluminous do not, on this account, always suffer from those symptoms which constitute what is called *disease of the heart*, more especially if they are, in other respects, strong and robust.

In children, more particularly, the heart is perhaps always a little larger in proportion, than in the adult; and many of them exhibit, in a marked degree, the stethoscopic signs of hypertrophy or dilatation, or more commonly of both,—without being at all diseased. In these persons the equilibrium is restored about the period of puberty. A person in youth or manhood, who is otherwise of a good constitution, may be affected with considerable hypertrophy or dilatation, without experiencing much inconvenience;—occasional palpitations of little severity and short

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with dilatation of the right; 5. dilatation with attenuation of the left; 6. hypertrophy with contraction of the left; 7. hypertrophy with contraction of the right. —*Transl.*

duration, and a slight shortness of breath, being the only general indications of the disease. Among the lower class of people, more particularly, the individual is frequently so little incommoded by the affection, that he pays little attention to it and never mentions it unless questioned on the subject.* I have observed a like condition of the organ in persons affected with diseases of other parts; and when these last have proved fatal, I have always been able to verify by dissection the accuracy of the stethoscopic indications respecting the state of the heart. In cases of this kind, if, from the effect of disease, or the progress of years, there happen to supervene a great degree of emaciation and loss of strength, the disproportion between the heart and other organs becoming thereby more marked (emaciation being much less rapid in the viscera than in the external parts), the general symptoms of diseased heart supervene. A delicate woman, or a man of sedentary habits with a constitution weakened by want of exercise, would experience in a much shorter period, serious symptoms from a like degree of disproportion.

For these reasons, it is obvious that we should sometimes fall into error, if we decided from the stethoscopic signs alone, that a patient laboured under disease of the heart. But the knowledge thus acquired of the existence of a large-sized heart, is highly valuable, even although the individual at the time experiences no inconvenience from it. We are thereby enabled to direct measures for diminishing the too active energy and nutrition of the organ, and thus to prevent the establishment of actual disease. This is a matter of the greatest consequence, as it is a vast deal easier, more particularly in young subjects, to effect this object, than afterwards, when the disease is formed, to interrupt its progress or even to relieve its more distressing symptoms. And, in truth, one of the greatest advantages of mediate auscultation, is the facility which it gives of recognizing, not merely the slightest degree of hypertrophy or dilatation of the heart, but even the simple pre-disposition to these diseases; a thing altogether impossible, as Corvisart has confessed, by the sole results supplied by the pulse, percussion, and the state of the functions.

I formerly observed that, in certain cases, the contractions of the heart entirely lose the characters which announce dilatation or hypertrophy, although existing in a very great degree. These cases are,—1. the last agony, and the orthopnœa which usually precedes this, for some days or even weeks:—2. the co-existence of another affection, capable, in itself, of occasioning great dyspnœa, as pneumonia, œdema of the lungs, hydrothorax, pleurisy

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* I daily meet with cases of this kind, which, but for the stethoscope, would deceive any practitioner. Such persons, however, are marked for destruction. After a certain time, the disease obtains the mastery, and "cuts the strong man down;" and the sooner, alas! for the bold resistance made to its dominion.—*Transl.*

the hypertrophy or dilatation, although perhaps e
very eminent degree.

CHAPTER VI.

OF DILATATION AND HYPERTROPHY OF THE A

DILATATION of the auricles is a rare disease, and it
more so, when compared with the frequency of the sa
of the ventricles. Sometimes we find in subjects a
hypertrophy or dilatation of the ventricles, the auric
portionably enlarged; it is, however, much more com
these retaining their natural size even in cases where
cles are enormously enlarged; sometimes also, but
still, the auricles are dilated when the ventricles are
tural size.

Before we can judge of the extent of this affecti
have precise ideas respecting the natural proportion
rious cavities of the heart. As far as the *cavities* are
we must admit that they are very nearly of equal s
the walls of the auricles are much thinner than those
tricles, the former, when simply full and not distende
only about one-third of the whole organ,—in other
size of the auricles is about one-half that of the ventri
the auricles have the same capacity, although some
have considered the right as larger; no doubt misled

dilatation, we have only to empty the auricles through the vessels that enter into them, when, in the latter case, these cavities will immediately resume almost their natural size, and, in the former, they will still nearly retain their acquired volume. There is likewise another mark by which we can at once discriminate the enlargement produced by the accumulation of blood during the few last hours of life, from the permanent increase of capacity of the auricles. In the first case, the walls of the auricle are greatly distended by the contained blood, and the colour of this appears through the thinnest portions; while, in the latter, the auricles, although very voluminous, are still capable of containing more blood, and their parietes remain opaque.

I have never met with decided dilatation of the auricles without some thickening of their walls; and, on the other hand, I have never seen thickening of their walls without an augmentation of their capacity.* I may here remark, that it requires much experience to judge correctly of hypertrophy of the auricles, as, owing to their being naturally very thin, a considerable increase (say double the natural thickness, and the increase is rarely so much) is not obvious to a person little accustomed to such examinations. Bertin (Op. Cit. p. 334) met with a case where the left auricle was three lines thick.

The most common cause of dilatation of the left auricle is the contraction of the orifice between it and the ventricle, in consequence of cartilaginous or bony induration of the mitral valve, or of caruncles on its surface. The same causes sometimes occasion the retraction of this valve, and consequently the permanent patency of the auriculo-ventricular orifice. In this case, dilatation and thickening may arise from the mere action of the ventricle on the auricle. Although such may exist, I have never seen any change in the auricles without some alteration in the valves. Dilatation of the right auricle is most commonly the consequence of thickening of the right ventricle. The diseases of the lungs which M. Corvisart reckons among the ordinary causes of this dilatation, seem to me to produce, in general, merely the accidental distension above mentioned.

Corvisart does not make any distinction between the signs of dilatation of the auricles and that of their corresponding ventricles. And, in truth, such affections are too rare, and I have had, consequently, too few opportunities of seeing them since I practised auscultation, to be able positively to assert, that the signs by which I have sometimes been enabled to recognize them,

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* M. Bertin says (p. 336) that he has seen hypertrophy of the auricles under the three forms observed in disease of the ventricles; but that that with dilatation of the cavity, is incomparably more frequent than the others. Dr. Hope gives the following as the order of frequency of the different forms of enlargement of the auricles:—1. Distension, particularly of the right, from congestion during the last agony; 2. dilatation with hypertrophy; 3. simple hypertrophy; 4. hypertrophy with contraction.—*Transl.*

the bellows-sound, more or less strong, or at leas
is dull. I have never perceived any distinct imp
auricles, even when decidedly hypertrophied. I
also, to notice a negative sign, formerly mentioned
of the heart's pulsation. It is this:—In many ca
trophy of the ventricles, we scarcely perceive the
contraction of the auricles, while exploring the
heart. If, however, we apply the stethoscope to t
sternum, below the clavicles, or on the sides, we h
of their contraction very distinctly, and often very
sign, as I formerly mentioned, appears to me to
tively that the auricles do not in any respect part
affection of the ventricles.

CHAPTER VII.

OF PARTIAL DILATATION OF THE HEA

In certain cases, the heart may be affected with
truly aneurismatic dilatation. M. Corvisart founc
son of a young negro who died from suffocation,
this affection. "On the superior and lateral part of
(the left) there was a tumour almost as large as th
The interior of this tumour contained several layers
blood, very dense, and exactly like those found in
the limbs.—The cavity of this tumour communic

both of these cases, the dilatation was in the inferior portion of the left ventricle, was of a globular shape, and nearly the size of a duck's egg. A sort of neck, or circular depression, distinguished it externally from the upper part of the ventricles. In the first case, of which I saw the preparation, the channel of communication between the left ventricle and the tumour was more than an inch in diameter. The interior of the swelling was lined by half-dried fibrinous concretions, of a yellowish colour, disposed in concentric layers, some of which were firm and others slightly friable;—in a word, exactly resembling those found in the sacs of aneurisms. The most exterior of these layers were the most solid; and these adhered so firmly to the walls of the aneurism, that it was impossible to separate them from it, without removing, at the same time, a portion of the muscular substance of the heart. This intimate adhesion existed even in the point of communication, the borders of which were somewhat rough. On the left side of the sac, the continuity of the fleshy fibres of the heart was very distinct; but on the right or inner side, in which place the tumour projected beyond the point of the right ventricle and septum more than the thickness of the finger, the walls of the sac seemed merely composed of the two membranes of the pericardium united together by cellular substance, and by the fibrinous layers within. M. Berard's second case differed only from the first in the following particulars: the two layers of the pericardium were here united over the surface of the tumour only, whereas, in the first case, they were adherent over their whole extent; the fibrinous concretions were softer, consequently of more recent formation; and there co-existed hypertrophy with dilatation of the ventricle.* The general aspect of the preparation shown me by M. Berard, leads me to consider these partial dilatations as originating in ulcerations of the internal face of the ventricles. I form this opinion on the following grounds:—the decreased thickness of the muscular substance,—the intimate union between it and the layers of fibrine,—the complete disappearance of all fleshy columns,—the analogy of the case with the false consecutive aneurism of the arteries. As hardly any information could be obtained respecting the history of these cases, I cannot say whether the stethoscope is likely to give any sign of a lesion of this kind.† The same may be said of another rare species of dilatation described by Morand,[*] a second case of which was communicated by me to the Soc. de la Faculté de Méd.[†] This is a dilatation formed in the middle of one of the lips of the mitral valve, resembling a thimble or glove-finger projecting into the auricle. In the case seen by me, the little pouch projecting from the upper side of the valve was about half an inch long, more than four lines wide, and was pierced at its extremities by two openings, of which the lowest was the largest. This last was irregular and fringed, and had the appearance as if the lower lamina of the mitral valve had been ruptured in this point, and the little aneurismal sac had been formed by the dilatation of the upper lamina.

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* In the celebrated tragedian, Talma, who died of a disease of the rectum, there was found a partial dilatation of the heart precisely like those described in the text. "In the left ventricle (says M. Biett) there was an aneurismal sac of the size of a small egg, (filled with hard fibrinous layers,) and of which the parietes seemed formed, by the double thickness of the two serous membranes of the heart. (*Revue Méd.* Jan. 1827.) (*M. L.*)

† Laennec's opinion of the origin of these partial dilatations from ulceration is corroborated by a case mentioned by Dr. Hope, "in which steatomatous degeneration had caused the formation of a canal from the aorta underneath one of the sig valves and the internal membrane of the left ventricle, leading to an aneuris large as a nut, in the substance of the auriculo-ventricular septum." In this ca

There is still one other variety of partial dilatation of the heart, which I have several times met with, and which is probably, in a great measure, the result of original malformation. In the natural conformation of the heart, the right ventricle seems to consist of two distinct parts united together, the one of which descends towards the apex, while the other, almost at right angles to the former, is directed to the left side, and forwards towards the pulmonary artery. The dilatation to which I now allude, seemed to exist in both these divisions, while the point of union of the two retained its natural dimensions. It is, however, more common to find the anterior or pulmonary division of the ventricle dilated without the other portion; and in most cases of dilatation of this ventricle, the former portion is more dilated than the other. This difference becomes still more evident when the dilatation is conjoined with a certain degree of thickening, as, in this case, the pulmonary portion of the ventricle frequently acquires such a degree of firmness that its walls do not collapse when laid open, a thing which hardly ever happens to the lower portion of the ventricle.

CHAPTER VIII.

OF INDURATION OF THE MUSCULAR SUBSTANCE OF THE HEART.

I HAVE already observed, that, in hypertrophy of the heart, the muscular substance possesses an unusual degree of firmness and consistence. Corvisart has seen this so great, that the heart

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physical signs were not noticed, but Dr. Hope adds, that a similar case occurred subsequently in St. George's Hospital, in which the second sound was accompanied with a bellows-murmur.—Treatise on the Heart, p. 286.—*Transl.*

[*] Hist. de l'Acad. des Sc. 1729.

[†] Bulletin de la Faculté de Méd. No. 14, p. 207.

sounded like a dice-box when struck, and the scalpel experienced great resistance in cutting it, and produced a peculiar creaking sound. However, the muscular substance of the heart "retained its natural colour, and did not appear to be converted either into the bony or cartilaginous tissue." I had been long of opinion that this species of induration is extremely rare, having never met with a case of it, although Corvisart says that he had seen several. However, in the year 1821, while examining the body of a man who had died of simple but very extensive hypertrophy of the right ventricle, I purposely struck this ventricle with the scalpel, and found that it produced a sound exactly resembling what would arise from striking a leathern dice-box.* I have since frequently repeated this experiment, and have ascertained that the ventricles in a state of hypertrophy always yield this *box-sound*, and in a degree proportioned to the degree of the hypertrophy. I have never observed the creaking sound mentioned by Corvisart: but only that such hearts were cut with greater difficulty, although the muscular substance appeared in no other respect altered. M. Bertin gives three cases (Obs. 93, 94, 95) of hypertrophy with strongly marked induration of the heart. Corvisart imagined that this state of induration would render the contraction of the ventricles more difficult and would impede their motions. I cannot assent to this opinion, since I have always found the most solid hearts to be those which gave the greatest impulse. Neither can I admit with M. Bertin, that the induration of the heart may be considered as the first stage of the ossification, since there exist none of the anatomical characters of the transition of one of these states into the other. Induration usually occupies the whole of one ventricle, while ossification affects only a small portion of its walls, and, as we shall see hereafter, rarely attacks the muscular substance. If to these reasons, deduced from simple observation, we wish to add any arguments drawn from theory, it may be stated, that induration supposes an increase of nutrition, and ossification a perversion of the nutritive action.†

CHAPTER IX.

OF SOFTENING OF THE MUSCULAR SUBSTANCE OF THE HEART.

I HAVE already noticed this condition of the heart. It is recognized by the flaccidity of the organ, which, at first sight, looks

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* It is proper to observe that the ventricle had been emptied of its blood.—*Author.*

† Otto (Compend. of Pathol. Anat. Part. II. Sect. xix. p. 286. South's Transl.) says, that he has several times found "general inflammatory hardening of the heart"

the case in severe continued fevers. More commonl
the softening of the heart is attended by a striking los
so as to resemble the palest dead leaf. This pale c
tint does not always occupy the whole thickness of
sometimes it is strongly marked in the central portion
little on the exterior or inferior surfaces. Frequen
ventricle and the interventricular septum exhibit this
in a marked degree, while the right ventricle retains
colour, and even a degree of firmness greater than natu
we sometimes find here and there spots of the natural
consistence in hearts which are, every where else, mu
and quite yellowish. This variety of yellowish softe
ticularly observable in hearts of good proportion, a
cases where dilatation is conjoined with a slight degr
trophy. It is also found in simple dilatation, althoug
common to find this state accompanied by that species
which is marked by an augmentation of the natural c
organ. There is a third variety of softening of the h
will be noted in another place, and which is attende
white colour of the muscular substance. In this, th
softening never reaches that of friableness; often it
perceptible; but the parts are flabby, and the walls
tricles quite fall together on being opened. This
softening usually accompanies pericarditis, and is ob
in it.

Softening of the heart not having hitherto engage
tion of practitioners, and being almost always found
tion with other diseases of this organ, it becomes very
determine its degree of danger, as well as its distincti
formerly stated, that softening of the heart is one of
which appear to me to render the sound of the auricle
of the ventricles more obtuse than natural; yet nev

long and painful agony, or that purple condition of the face and extremities for a long period before death, which bespeaks great congestion of blood in the capillaries. It would seem that that species of softening met with in the case of a protracted agony is to be considered as an acute affection: it is rarely general, and commonly affects only different points of the substance of the heart.

On the contrary, in cases where the heart is softened and yellowish throughout, it is probable that the affection has existed for a longer time. This general softening of the heart is usually, perhaps always, accompanied with a certain degree of cachexy, even when it exists in persons otherwise in good health, and even in such a state of vigour as to be able to undergo severe bodily labour, as we see sometimes. These persons have a pale and yellowish complexion and a withered skin; and even when they become affected with dilatation or hypertrophy, which is almost always the case, they do not exhibit that swollen and livid state of the face, which is considered as one of the most constant of the general signs of diseased heart. Their lips are seldom purple, and still more rarely swollen; but, on the contrary, almost always colourless. When the heart yields only a slight impulse and sound, and when this last is obtuse and dull, during both contractions, we are led to presume that the organ is softened, but well proportioned.

When softening exists along with dilatation of the ventricles, the sound produced by the contraction of these cavities, although loud, is yet dull, and without the clearness which attends common dilatation. When it is complicated with hypertrophy, the sound of the contraction of the ventricles is so obtuse as to be nearly inaudible; and in extreme cases, the impulse of the heart is attended by no noise whatever. It has moreover appeared to me, that softening of the heart contributes much to render the contraction of the ventricles slower. Sometimes, however, in attacks of palpitation, a heart in this state, and which had habitually only a slight shock and a very dull sound, all at once will resume great energy, and for several days continue to give those sharp short contractions which have been compared to the blows of a mallet.

In respect of the danger attending softening of the heart, I presume that it will vary according to the nature and degree of the accompanying affection. The variety of softening which accompanies idiopathic fevers, does not, in general, present any change of colour in the heart, or it is attended with a deeper colour than natural, approaching purple; sometimes, however, it is yellowish. I think it may be compared to that adhesive softness of the other muscles, often observed in these cases, and which is also accompanied by a degree of redness greater than natural. This softening of the heart, as well as the analogous *gluey* or *fishy* state of the muscles, is particularly observable in putrid fevers, more especially when these exhibit the phenomena formerly considered as marks of putridity; viz. livid intumescence of the face, softening of the lips, gums, and internal membrane of the mouth, black coating on the tongue and gums, earthy aspect of the skin, distended abdomen, and very fetid dejections. I cannot assert that this softening of the heart exists in all kinds of continued fevers, but I have met with it constantly in such cases as I have attended to; and I have always thought it more marked in proportion as the signs of an alteration in the fluids were more evident. Could it account for that frequency of pulse which exists, sometimes for several weeks, in convalescence from fevers, although the patient continues to regain flesh and vigour?

M. Bouillaud, in the work which he has composed in conjunction with M. Bertin,* considers softening of the heart as a consequence of inflammation; and looks upon the induration, as well as the increase or diminution of colouring of the heart, in the same point of view. The only proof brought in support of this opinion is this—that the muscles, the brain, liver, lungs, kidneys and spleen, become soft when affected with inflammation. In respect of this, I would remark, that the reasoning is here in a circle; since it ought to be previously proved that the softening of these organs, when existing alone and without pus, is the consequence of inflammation. On the other hand, if softening of the heart is the consequence of inflammation, this inflammation must be either some degree of that which produces pus, or one of quite a different kind, and having no tendency to produce this. On the first hypothesis, softening of the heart is so common an affection, that we should, sometimes at least, find it arrived at the stage of purulent infiltration: but this state I have never seen, even in the case of softening that has reached so far that the muscular substance yields between the fingers like paste; the muscular fibres still retain their form, and present no trace of pus in their interstices; and I am not aware that pus has been found by any one in such cases.† If, on the second supposition, softening of the heart is an affection of such a nature, that it tends neither to the formation of pus, nor is attended by local pains, nor any of the local and general symptoms which constitute inflammation;—if the therapeutic measures found beneficial in inflammation, are directly the reverse of those which the state of the individuals usually affected with softening of the heart seems to demand,—why give the same name to affections so different?

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* I attribute this opinion to M. Bouillaud, on the authority of M. Bertin, who informs me, that every thing in this work relative to the influence of inflammation in the development of the organic affections of the heart and large vessels, is exclusively M. Bouillaud's. This gentleman has since professed the same opinions in his *Traité de l'Encéphalite. Paris*, 1825.—*Author.*

† In a striking case of true carditis recorded by Dr. Latham (Lond. Med. Gaz. vol. iii. p. 118) the muscular substance of the heart was found softened, and "innumerable small points of pus oozed from among the muscular fibres" of both ventricles.—*Transl.*

Softening of the heart appears to me to be a disease *sui generis*, produced by some aberration of assimilation, whereby the solid elements of the tissue diminish in proportion as those which are fluid or semi-fluid increase. All the muscles become soft, in a slight degree, in many acute and chronic diseases even in the course of a few days; a fact which we can prove not only by dissection, but even by feeling the muscles of our patients: and this change, we know, ensues without any sign of inflammation. In the case of convalescence, the firmness of the muscles frequently returns very speedily, and before the emaciation is quite gone off. In the inflammation of the muscles, on the other hand, (a very rare case, except in surgical affections,) softening is not observed, except where the muscle is destroyed by suppuration: one or two lines from the abscess, the muscular substance, more or less coloured according to its degree of impregnation with blood or with liquid or concrete pus, is more or less solid, and frequently even more solid than natural. If the muscular substance appears softer than natural, it is only where the concrete pus begins to soften; and it is, no doubt, owing to the softening of this pus, which, in the muscles, the cellular substance, the parenchyma of the lungs and other organs, as well as the surface of membranes, is frequently effused in a concrete form, that we are to attribute the dissolution of the various tissues with which it is combined. I consider even, that we ought to regard it as a general law of the animal economy, that all soft tissues become indurated in consequence of true inflammation, that is, an inflammation tending to the formation of pus: and I know no other way in which we can define inflammation without making it synonymous with *affection*. It is only the hard tissues, such as bone, cartilage, and the fibrous bodies, which become softer during inflammation, in consequence of the presence of an increased quantity of plastic lymph of a less consistent quality than that of bone. The softening of the heart and muscles, is, moreover, not without analogies in all the different tissues of the system, as in the case of rickets, the white softening of the brain, the softening of the mucous membrane of the stomach and intestines, which is frequently transparent, colourless and jelly-like; which last Hunter considered as the effect of the action of the gastric juice, and of which Jaeger* and Cruveilhier† have recently published instances. These various cases of softening may, it is true, sometimes, like gangrene, be surrounded by a circle of inflammation; but most commonly the softening exists by itself: when combined with inflammation, there is no reason

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* Hufeland's Journ. May, 1811.

† Méd. Eclairée par l'Anat. Path. *Limoges*, 1821.

an analogous disposition to that of hypertrophy or
far, at least, it agrees with these, in being the produc
alteration of the nutrition of this organ. In this c
no evident *perversion* of the assimilative process, si
no accidental formation. For this reason, it seems p
when the heart is in a state of softening and hypert
same time, we are to expect most benefit from the
mode of treatment; and on the other hand, if the
its healthy proportions, we ought to apprehend, f
reason, and more than in any other circumstances, th
tion of hypertrophy and dilatation, in consequence
creased resistance afforded by the walls of the heart.*

CHAPTER X.

OF ATROPHY OF THE HEART.

THE heart, like the muscles of voluntary motion, is
ceptible of diminution of size, and loss of power, f
fluence of all those causes which produce emaciation.
however, is less remarkable in the heart than in oth
and does not become perceptible till after a consid
It may be remarked as generally true, that the he
viduals who have died of diseases productive of great
such as cancer and chronic phthisis, are commonly
in examining such cases, I have thought that I coul
a sort of withering of the organ indicative of its loss

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* Preternatural softness of the heart is a state frequently

From this circumstance, I am led to consider the softening of the heart (which I have stated to exhibit a similar appearance) as an approach towards atrophy,—unless, indeed, the over-activity of the nutritive process, or the determination of too much blood to the organ, lead to dilatation. The facts just mentioned furnish the most rational indication for treating hypertrophy of the heart, as they, at once, afford grounds for admitting the possibility of a cure, and point out the best means of effecting it. In certain cases of chronic pericarditis, the heart seems to become smaller in consequence of the long-continued pressure of a copious extravasation into the pericardium. M. Bertin reports a case of this kind (Op. Cit. obs. 66.)

I do not think that diminution of the size of the heart, can, in any case, be considered as a disease. I have never observed any symptom which could be attributed to this cause; or rather, all those persons in whom it was found, appeared to me less subject than usual to inflammatory affections and disorder of the circulation. I may remark, however, that several hypochondriacs, who were liable to faintings from very slight cause, gave, under the stethoscope, signs of a very small heart; and we know, moreover, that women, who are much more liable to these attacks than men, have in general smaller hearts.[*]

CHAPTER XI.

OF DISPLACEMENT OF THE HEART.

The heart, although retained in its place by the diaphragm, large vessels, and peculiar structure of the mediastinum, and, still more, by the constant state of plenitude of the chest, may, nevertheless, in certain cases, be thrown to the right or left by a solid, liquid, or aeriform effusion into either sac of the pleura, by extensive tumours in the lungs, and, as we have already seen, by emphysema of this organ. In like manner, a tumour in the superior mediastinum, or a large aneurism of the arch of the aorta, may press it downwards, so that that part of the diaphragm on which it reposes shall project into the abdomen. Sometimes even this depression has taken place without any visible cause, in which case the affection has been named by some authors *prolapsus* of the heart.

When the heart is enlarged, its point is carried to the left, and the auricles to the right side, in such manner that it comes to lie almost transversely across the chest. This observation has been made by M. Bertin: (Op. Cit. p. 44.) and I have myself often proved its accuracy.

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[*] Diminution of the size of the heart is noticed by most writers on diseases of this organ, and a good many cases of it are given by Burns, Testa, Kreysig, Bertin, &c. See, in particular, Burns, p. 109; Testa, vol. iii. p. 548; and Bertin, p. 387.—*Transl.*

These various kinds of displacement produce no perceptible inconvenience when they exist in a slight degree: when more marked, they may produce bad effects: but in this case, they are themselves consequences of lesions much more serious. Corvisart imagines that this *prolapsus* of the heart is always the effect of considerable dilatation of this organ: and that it occasions acute and continued pains in the oesophagus, particularly towards the cardiac extremity, with difficulty of deglutition, pains in the stomach, constant disorder of the digestive functions, and nausea and vomiting. He thinks, moreover, that in this case the action of the heart is perceived much lower than natural, and he considers this circumstance as one of the chief diagnostic signs of this affection. I am, however, of opinion that this sign is, at best, very equivocal. We perceive the heart's pulsation in the epigastrium in a great many persons, particularly when the sternum is short, although the heart is in its usual position. It can be only, therefore, in subjects whose sternum is long, that we can lay any stress on such a sign. In the case of lateral displacements, if at all considerable, they will be readily detected by the stethoscope: and the same will be true in those rare cases of transposition of the viscera, in which the liver is on the left, and the heart on the right side.* In the *Ephem. Nat. Cur.* (vol. x. obs. xxxvi.) there is a case in which the heart was situated perpendicularly to the vertebral column, as in quadrupeds, and without any trace of a right lung. From the last-named circumstance it seems probable that the case has been inaccurately described.†

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* A case under my observation some time since strikingly demonstrated the accuracy of this statement. A patient, in the clinical wards of La Charité, had the heart pushed towards the right side by an aneurismal tumour of the descending aorta, which eventually burst into the left sac of the pleura. In this case we were enabled, by means of the stethoscope, to trace accurately the progressive advance of the heart towards the right side. The aneurism lay saddle-wise right across the spine, and was recognised by its proper pulsations from the period of the patient's admission, viz. three months nearly before death.—(*M. L.*

† LITERATURE OF DISPLACEMENT OF THE HEART.

Innumerable cases of displaced heart are on record. On this subject I particularly refer to the learned memoirs on this subject in Testa, (vol. iii. cap. xviii.) and Kreysig [illegible] to the short chapters on the same subject in Bertin, p. 441; Hope, [illegible] and to the following dissertations on this particular displacement.

[illegible] Hoffman. F. Cardianastrophe admiranda. Diss. *Lips.* 4to.
[illegible] Martinez. Obs. rara de corde, &c. *Madrit.* 4to.

[illegible] Fleischmann. De vitiis congenitis circa thoracem, &c. *Erlang.* 4to.
[illegible] Chaussier. Note sur une hernie congenitale du cœur (Bull. de la Fac. de Méd.) *Par.*
[illegible] De situ cordis abnormi. *Vratisl.* 4to.
[illegible] Weese. K. De cordis ectopia. *Berl.* (with engr.)
[illegible] Haan, H. J. De ectopia cordis casu illustrata. *Bonn.* 4to. (plates.)
[illegible] Breschet. Memoire sur l'ectopie du cœur, &c. *Par.* 4to. (with plates.)

CHAPTER XII.

OF MALFORMATION OF THE HEART.

DEVIATIONS from the natural form of the heart, exclusively of those resulting from dilatation or hypertrophy of its different parts, must almost all be considered as monstrosities, depending on an incomplete, anomalous, or superabundant development of parts. Many varieties of these have been taken notice of, particularly during the last few years; and I shall here mention such as have been well authenticated: 1. The foramen ovale unclosed after birth. This is a case so common, as to have been seen by almost all pathological anatomists. 2. The perforation of the septum between the ventricles. There only exist a few cases of this; and in all those which have been published, as far as I know, the opening was evidently very ancient, and appeared to be congenital. It is, however, possible that such a perforation may be produced by an ulcer. I was lately presented with a heart by M. Fouilhoux, which exhibited an opening between the ventricles, capable of admitting a goose-quill, and extending from beneath one of the laminæ of the tricuspid valve to beneath the origin of the sigmoid valves of the aorta. At the extremity which opened into the left ventricle it was smooth, but at its other extremity, and within the septum, its surface was rough, evidently ulcerated, and covered with fibrinous crusts. The ulcerated portion had a diameter at least double that of the opening into the left ventricle, and extended about three lines into the septum, forming a small cul-de-sac filled with fibrinous concretions. This heart had yielded the bellows-sound in the latter days of the disease. Dr. Thibert, some years since, met with a similar perforation, near the junction of the septum of the auricles and ventricles, disposed in such manner that the four cavities of the heart communicated together by means of it. 3. The foramen ovale and ductus arteriosus have been found patent at the same time by Deschamps, Fouquier, Thibert, Monro, and Burns. 4. Hunter found the pulmonary artery obliterated at its origin, so as to receive blood only by the ductus arteriosus. 5. In a child which lived seven days, the heart, like that of fishes, had only one auricle and one ventricle, from the latter of which the aorta and pulmonary artery arose by a common trunk.[*] 6. The aorta originating in the right, and the pulmonary artery in the left ventricle. 7. Wolf[†] and Bres-

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[*] Burns on the Heart, p. 27. The *Ephem. Nat. Cur.* contains two similar observations. Dec. i. ann. iv. and v. obs. 40; et Dec. ii. ann. x. obs. 44.

[†] Kreysig, vol. iii. p. 200.

Scander, Tielman, and Nevins. 10. Dr. Holmes of
lately related a case in which the right auricle, of
full grown fœtus, communicated with the left vent
of the right. The ventricles also communicated by
opening. This person lived to the age of twenty-o

The valves of the heart may likewise exhibit var
malformation. I have already noticed a species of
dilatation of the mitral. We sometimes also me
oblong smooth openings on the different valves of
this I have seen an extensive instance on the tric
constituting a kind of net-work. The following see
a case of malformation, which I observed in a heart
hypertrophy in the year 1823. In this the three l
tricuspid valve were united together near their ext
in such manner as to leave these points sufficiently
the end of the finger between them. The mitral
in the same state; and contained, moreover, within
some small cartilaginous incrustations. The sigmo
the aorta and pulmonary artery were in like man
to one another, for the space of about one or two
point of their meeting. The valves seemed in no o
eased, and the union of the parts was so intimate, t
of the different valves could not be distinguished.
sound had existed very distinctly in this case, on
the heart. We may fancy that the appearances no
case may be the consequence of inflammation in th
yet it is difficult to believe that the coagulable ly
so accurately confined to the edges of the valves, as
adhesion or thickening should have been produced on
parts.†

In a practical point of view, these various kinds
tion may be reduced to one—the unnatural comm

liquely from one auricle to the other. This condition of parts is not very rare, and does not appear to be productive of any kind of inconvenience. In other cases we find the foramen continue constantly open, so as to admit the finger. I have myself seen it, in a subject forty years old, sufficiently large to receive the thumb. It is commonly believed that this species of malformation is always congenital; but from some cases which I have met with, I am disposed to believe that such a perforation may be produced by an accident; or, at least, when such a condition of parts exists as above described, that a blow, fall, or violent exertion, may cause the dilatation of the oblique opening, and its progressive enlargement. The history of several cases on record, especially of some of M. Corvisart's, would seem to confirm this opinion; since, in several of these, the individuals had enjoyed good health, without any symptom of diseased heart, until they had experienced some of the accidental causes above mentioned.

I do not know that any of these unnatural communications have existed without consequent thickening and dilatation of either the whole, or part of the heart, especially the right side. This may be the consequence, either of the too stimulant qualities of the arterial blood, or rather of the necessity imposed on the right cavities (naturally the weakest) of a more energetic action, in order to resist the impulse of the blood flowing from the left side. The symptoms of the latter affection are, consequently, combined with those of the former. These are principally the four following: 1. a great sensibility to the impression of cold; 2. frequent faintings; 3. the respiration more constantly impeded than in most other diseases of the heart: and 4. a violet or blueish colour of the skin, much more extensive than in any other disease, and, sometimes, even general. This last symptom has been named by several authors *the blue jaundice*, *the blue disease*, or *cyanose*. It is to be observed, however, that in certain diseases of the lungs, particularly emphysema, the blue colour of the skin is sometimes as considerable and as general as in this affection. On the other hand, the foramen of Botallus has been found dilated very considerably, without there being present any degree of lividity except in the face and extremities. The case of extensive dilatation noticed by myself, above mentioned, was of this sort.

I have not had an opportunity of studying by means of the stethoscope the peculiarities presented by the circulation in the case of malformation of the heart. I presume, however, that such exploration would not supply us with any useful diagnostic signs. In these cases the two sides of the heart contracting at the same time, and being both full, the two masses of blood when coming in contact will not give rise to any distinct sound. Corvisart, however, says, that in such cases the hand applied to the cardiac region perceives a kind of *bruissement*, and an *indescribable agitation*. In the case above mentioned, witnessed by myself, I perceived nothing of this kind.*

CHAPTER XIII.

OF CARDITIS, OR INFLAMMATION OF THE HEART.

INFLAMMATION of the heart is a rare affection, and is, consequently, very imperfectly known, both in a practical and pathological point of view. I shall here notice only inflammation of the muscular substance of the organ. There are two varieties of it; the general, or that affecting the whole heart; and the partial, or that confined to a small extent of it. There perhaps does not exist on record a satisfactory case of general inflammation of the heart, either acute or chronic. The greater number of cases so called, and particularly those given by M. Corvisart, are evidently instances of pericarditis, attended by that degree of discoloration of the heart which we shall find frequently to accompany that affection. Nothing proves that the paleness of the heart in such cases is the consequence of inflammation, unless, indeed, we choose to consider the word *inflammation* as synonymous with *alteration* or *disease*. Inflammation generally increases both the redness and density of the parts which it occupies;—but the discoloration in the cases alluded to is conjoined, in general, with a perceptible softening of the heart. It is further observable that, in these cases, the pericardium was filled with pus, while not a particle was found in the substance of the heart itself: now, pus must be considered as the most unequivocal indication of inflammation. The redness and injection of the capillaries are equivocal signs, inasmuch as they may be produced, even in the dead body, by gravitation, and as they commonly appear to be the consequence rather of the state of things immediately preceding death, than of any actual previous disease. The only case which I have met with of general inflammation of the heart possessing this unequivocal mark, is noticed by Meckel in the Mém. de l'Acad. de Berlin, for 1756.[*] But this case is described with so little precision, as merely to prove the possibility of the fact, and affords no help towards a general description of the disease. I am not acquainted with any undoubted example of gangrene of the heart.

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* LITERATURE OF MALFORMATION OF THE HEART.

1802. Meckel. (J. F.) De cordis conditionibus abnormis. *Halæ*. 4to.
1814. Farre. (J. R., M.D.) Pathological researches. Essay I. On malformation of the heart. *Lond*. 8vo.
1816. Hein. (J. C.) De istis cordis deformationibus, &c. *Goett*. 4to.
1824. Gintrac. (El.) Obs. et rech. sur la Cyanose. *Par*. 8vo.
1824. Ramberg. De corde vasisque majoribus eorundum ratione abnormi in homine. *Berol*. 8vo. (with eng.)
1825. Beckhaus. (F.) De deformationibus cordis congenitis. *Besol*.
1826. Louis (P. C. A.) De la communication des cavités droites avec les cavités gauches du cœur. (Mémoires ou Recherches, &c.) *Par*. 8vo.
1831. Paget. (J., M.D.) On the congenital malformations of the heart. *Edin*. 8vo.

Burns, p. 11; Kreysig, Band. iii. s. 100; Bertin, p. 431; Hope, p. 456; Andral, (Precis,) t. ii. p. 309; Otto. Part II. sect. xix. p. 267; Meckel, Handbuch, vol. i. —Besides the above, we have numerous inaugural dissertations on the disease (Cyanosis, the *blue disease*) produced by the intermixture of the arterial and venous blood, one of the consequences of the most common form of malformation. The following are the most recent, and all entitled either *De morbo cæruleo* or *De Cyanosi*: —Seiler, *Viteb*. 1805; Schuler, *Œnip*. 1810; Kaemmerer, *Halæ*, 1811; Tobler, *Goett*. 1812; Haase, *Lips*. 1813; Hartmann, *Viennæ*, 1817; Marx, *Besol*, 1820; Zimmermann, *Berol*. 1822; Peters, *Kiliæ*, 1822; Horner, *Monach*. 1823; D'Alton, *Bonnæ*, 1824, Meinecke, *Berol*. 1825; Lewes, *Berol*. 1824; Ermel, *Lips*. 1827.

Transl.

Instances of partial inflammation of the heart, characterized by the presence of an abscess or ulcer in its parietes, are much more common. Benevenius appears to have been the first that observed an abscess in the walls of the heart. Bonetus has recorded a good many such cases in his *Sepulchretum*. I have only met with one instance of the kind. In this (in a child twelve years old) the abscess was situated in the parietes of the left ventricle, and might have contained a filbert: it was complicated with pericarditis. In another case, of a man sixty years old, I found an albuminous exudation, of the consistence of

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[*] Since the publication of our author's Treatise two unequivocal cases, at least, of general carditis have been published in this country, one by Mr. Stanley, (Med. Chir. Trans. vol. vii.) the other by Dr. Latham (Lond. Med. Gazette, vol. iii.). Mr. Stanley's case was a complication of pericarditis and carditis, but the inflammation of the muscular substance was as well marked as that of the serous membrane. "Upon cutting through its parietes," says Mr. Stanley, "the fibres were exceedingly dark coloured, almost of a black appearance. The fibres were also very soft and loose in their texture, being easily separable and with facility compressed between the fingers. Upon looking closely to the cut surface exposed in the section of either ventricle, numerous small collections of dark-coloured pus were visible in distinct situations among the muscular fasciculi. Some of these depositions were situated deeply, near to the cavity of the ventricle, while others were superficial and had elevated the reflected pericardium from the heart." In Dr. Latham's case "the whole heart was deeply tinged with dark-coloured blood and its substance softened; and here and there, upon the section of both ventricles, innumerable small points of pus oozed from among the muscular fibres. This was the result of a most rapid and acute inflammation, in which death took place after an illness of only two days." Even, on Laennec's own principles, the above must be received as cases of general carditis; but there can, I think, be little doubt that he is too rigid in excluding from the list of inflammatory affections of the muscular substance of the heart, several other cases which do not possess the same decisive test of pus. It is well remarked by Dr. Hope that few will concur with our author in excluding softening and induration with increased or diminished colour, from the signs of inflammation of the muscular substance of the heart. "These," says Dr. Hope, "are results of inflammation in other muscles, and analogy points out that they have the same origin in the heart. Further evidence," he continues, "is derived from the fact that, in cases of pericarditis, the characters in question sometimes occupy only a certain depth of the exterior surface of the organ, whence the presumption is almost positive that they originate in an extension of the inflammation from the pericardium." (Cyc. of Pract. Med. vol. iii. p. 289.)—*Transl.*

Ulcers of the heart have been still more frequ
than abscess ; they have been met with in its e
ternal surface.† All the cases, however, record
name are not quite correctly designated. In the
we frequently find a case of pericarditis, attende
and uneven pseudo-membraneous exudation, mi
ulcer of the exterior surface of the heart. Th
ticed by Morgagni. (Epist. 21 and 25.) That tru
surface, however, have been observed, is beyond
of this kind is described by Olaus-Borrichius in
words: "Cordis exterior caro, profundè exesa,
villos carneos putrescentes abierat;"‡ and simila
corded by Peyer§ and Graetz.‖ Ulcers on the in
of the heart are perhaps more common than on th
at least, there are on record a greater number
examples of the former. Bonetus, Morgagni, a
collected a great many of these.

The signs of ulcers of the heart are as obscure
scess. Morgagni, in comparing the cases of this
before his time, remarks that the symptoms varie
stance, and concludes that none are characteristi
that auscultation will supply us with any that ar
and I confess that I do not expect that it will.
only met with one case of this kind. The ulcer
ternal surface of the left ventricle, and was an in
an inch wide, and was more than four lines dee
This patient had laboured under hypertrophy
tricle, which had been recognized before death :
scope gave us no indication of the ulcer, nor even
of the ventricles which, judging from the

LITERATURE OF CARDITIS AND PERICARDITIS.

1717. Berger, Diss. de inflammatione cordis *Witteb.* 4to.
1729. Heimann, (A. B.) Diss. de pericardio sano et morboso. *Leid.* 4to.
1742. Hilscher, (S. P.) De exulceratione pericardii et cordis (Haller, Disp. II.)
1758. Gloger, Diss. de inflammatione cordis vera. *Jenæ.*
1775. Pohl, Pr. de pericardio cordi adhærente. *Lips.*
1778. Nebel, Pr. de pericardio cum corde concreto. *Liep.*
1788. Nunn, (M.) Diss. de carditide spontanea (Doering I.) *Erford.*
1789. Metzger, Diss. de carditide (Doering I.) *Regiom.*
1789. Metzger, Diss. de carditide. *Regiom.*
1807. Gaulay, (U.) Mémoire sur la gangrène du cœur. *Par.* 8vo.
1808. Davis, (J. F., *M.D.*) An Inquiry into the symp. and treat. of carditis. *Bath.*
1810. Lemazurier, (M. J.) Diss. sur la péricardite. *Par.* 4to.
1812. Bouillier, (J. C.) Diss. sur la difficulté du diagnostic de la péricardite. *Par.*
1813—1819. Merat. Dict. des Sc. M. (Art. *Cardite*) t. iv. (Art. *Péricardite*) t. xl. *Par.*
1817. Hertzberg, (G. L.) De carditide, Pt. I. and II. *Halæ.*
1819. Roux, Collectanea quædam de carditide exudativa. *Lips.* 4to.
1819. Huber, (C. U. J.) D. de carditide quæ epidemicé grassavit &c. *Gröning.* 8vo.
1819. Heim, Von der idiopathischen herzentzundung. (Rustz. Mag. B. vi.) *Berl.* 8vo.
1819. Gittermann, Geschichte einer epid. herzentzundung (Rhein. Jahrb. B. vi.)
1820. Roux, (F. L.) Comment. de carditode exsudat. (with col. engr.) *Lips.* 4to.
1821—1826. Chomel. Dict. de Méd. (Art. *Cardite*) t. iv.; (Art. *Péricardite*) t. xvi.
1822. Dorn, Beytrag zur diagnostik der herzentzundung (Hufeland's Journ.) Jan.
1822. Petrenz, Diss. de pericarditidis pathologia. *Lips.* 4to.
1823. Tacheron, (C. F.) Recherches anat. path. (t. iii. *Péricardite.*) *Par.* 8vo.
1824. Puchelt, (F. A. B.) De carditide infantum. *Lips.* 8vo.
1824. Hope, Cyc. of Pract. Med. (Art. *Pericarditis and Carditis*) vol. iii. *Lond.*
1826. Glas, Ueber Hertzentzundung. *Wurtzb.* 8vo.
1826. Krause, (   ) D. de carditide idiopathica acuta. *Berol.* 8vo.
1828. Stiebel, Monographia carditidis et pericarditidis acutæ. *Francof.* 4to.
1831. Horn, Encycl. Wörterb. (Art. *Carditis*) B. vii. *Berl.*
1832. Davis, (J. F., *M.D.*) A second inquiry respecting pericarditis or rheumatism of the heart. *Bath.* 12mo.

See also Morgagni, ep. 24. 45; Lieutaud, Anat. Med.; Portal, Cours d'Anat. Méd.; Frank, Prax. Med. Univ.; Baillie, Morb. Anat.; and the treatises of Corvisart, Testa, Burns, Bertin, and Hope on diseases of the heart.—*Transl.*

CHAPTER XIV.

OF RUPTURE OF THE HEART.

THIS terrible and, fortunately, very rare accident, is almost always the result of ulceration of the ventricular parietes. Morand has collected several cases of this kind in the Mém. de l'Acad. des Sciences for the year 1732; and Morgagni has described a similar instance. (Epist. 27.) Rupture of the heart from violent exertion, without previous ulceration, is much rarer still; and the number of incontestible examples of this is very small. Several cases, recorded as such, are so imperfectly described, as to leave a doubt whether the alleged rupture might not have been rather the consequence of the incisions of an inexpert dissector.* And more frequently still, even in the most recent cases, the affection is too imperfectly described to make us certain that the rupture was not the consequence of ulceration. The best authenticated examples of this kind of rupture are those given by Haller (Elem. Physiol.) and Morgagni. (Epist.27.)

It is surprising that the extreme thinness of the parietes of the ventricles, in the cases of accumulation of fat, does not give rise to rupture, more especially towards the apex and posterior part of the right ventricle. This is, however, so far from being the case, that ruptures of the right ventricle are much rarer than those of the left; and that, in this last, the rupture, when it occurs, is very rarely towards the apex, which is, nevertheless, the point where its walls have the smallest degree of strength and consistence. The rupture of the auricles in consequence of violent efforts, and without previous ulceration, has been observed still more rarely than that of the ventricles. Two instances, however, are recorded in the work of M. Bertin, p. 50. In one of these cases the rupture was produced by a fall; in the other it occurred without any perceptible cause: the heart was enormously loaded with fat. Portal knew an instance of rupture of the vena cava superior where it joins the auricle, in a young woman who died suddenly in a cold bath; (Anat. Méd. t. iii. p. 355;) and in the Ephem. Cur. Nat. (Dec. iii Ann. iii. obs 82,) there is a case of rupture of the right auricle and vena cava in consequence of external violence.

M. Corvisart has given, for the first time, examples of another species of rupture of the heart, of a less certainly dangerous nature;—that, namely, of the tendons and fleshy pillars of the valves. (Obs. 33. 40, 41.) In the three cases related by him the rupture appears to have been the consequence of violent efforts. A sudden and very intense feeling of suffocation was the immediate result of this accident, which terminated in exhibiting all the usual symptoms of diseases of the heart. In a subsequent chapter (on Excrescences on the Valves) a case will be detailed in which the rupture of the tendons of the pillars appears to have been the consequence of ulceration. Bertin (Obs. 31) has seen rupture of one of the pillars of the mitral valve, occasioned by violent fits of coughing.

Rupture of the auricles, ventricles, and large vessels within the pericardium, is not always followed by sudden death. In several cases the blood accumulated in the pericardium formed a solid coagulum, which checked for a time the hæmorrhage. Such a result would especially obtain, if the relative size of the heart and pericardium were such as to render a great effusion of blood impracticable. M. Cullerier saw an instance of rupture of the left ventricle, in which the wound was blocked up by a fibrinous concretion. (Journ. de Méd. *Sept.* 1806.)—These various kinds of rupture can, at most, be suspected in some cases, but cannot be certainly recognized by positive signs. It would seem possible that the morbid action of the mitral valve, after the rupture of its pillars, might afford some signs by the stethoscope. The severity of the symptoms, in such cases, must be very variable, according to the extent and place of the lesion. The rupture of all the tendons of a pillar must occasion much disturbance in the circulation. The complete rupture of a pillar, or its separation at its root, must occasion still more serious effects, in consequence of its floating about in the ventricles almost like a foreign body. But the rupture of one or two tendons only ought not to occasion very severe or permanent symptoms.*

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* Mistakes of this kind may be easily avoided, since no incision made after death will fill the pericardium with coagulated blood, as is always the case in true rupture of the heart.—*Author.*

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* *Apoplexy of the heart*, an affection which I am surprised has not been mentioned by Laennec, and of which several examples have been recently published by M. Cruveilhier, (*Anat. Path.* 3. Liv. *Par.* 1829,) appears to be, much more frequently than inflammation, the cause of rupture of the heart. This lesion has hitherto been observed only in the walls of the left ventricle when in a state of hypertrophy. Here, as in the case of other muscles, the boundaries of the apoplectic deposit are formed partly by the muscular fibres *ruptured* and partly by their simple displacement. When quite recent, these deposits contain merely coagulated black blood; when they have existed some days, their walls are of a blackish red which penetrates to a greater or less depth, and we can distinguish some shreds of muscular fibres amid the blood; still later, the contained fluid assumes the colour of wine-lees, and appears as if formed of an admixture of blood and pus; and, at last, it becomes entirely purulent, and the walls of the abscess are lined by false membranes. M. Rousset, whose thesis I had occasion to notice in the chapter on Pulmonary Apoplexy, (*Rech. Anat. sur les hemorrhagies, Par.* 1827,) has recorded a very fine case of muscular apoplexy, nearly universal, in which the heart was the site of three deposits, in the various stages just enumerated. These sanguineous or puro-sanguineous depositions in the walls of the heart, usually terminate in perforation either inwards into the cavity of the ventricle, or outwards into the pericardium. In the latter case their rupture is almost always immediately fatal. In the former case, the cavity becomes filled with the ventricular blood, and eventually the remaining exterior wall of the abscess being distended, gives rise, in all probability, according to the ingenious explanation of M. Cruveilhier (*Dict. de Méd. Pract.* t. iii. Art. *Apoplexie*) to those partial dilatations of the heart, described by M. Breschet under the name of *false consecutive aneurisms of the heart*, and of which two cases by M. Berard were noticed in Chap. VII. of the present Book. M. Reynaud, however, in a notice *of a particular kind of aneurism of the heart*, (*Journ. Hebd. de Méd.* t. ii. p. 363,) has attempted to show that these excavations in the walls of the left ventricle are sometimes, in reality, the result of a partial dilatation, they having been observed to be lined (according to him) with a membrane continuous with that of the natural lining of the ventricle. But in the cases adduced in support of this opinion by M. Reynaud, it is observable that the lining membrane of the aneurismal sac was thickened around the orifice of communication between it and the cavity of the ventricle; a circumstance which alone suffices, in my judgment, to prove, that the membrane lining the aneurismal sac was *not* a continuation of that of the ventricles, but an old adventitious membrane analogous to those which line fistulæ in ano, and are continuous with the mucous membrane of the rectum. In this point of view, then, the case of M. Reynaud differs in no essential respect from those of MM. Cruveilhier and Rousset, being merely an example of the manner in which the apoplectic abscess of the heart became cicatrized. All the cases of rupture of the heart hitherto published, appear to me to confirm the opinion that cardiac apoplexy is the most common cause of them. It is proper to

state, however, that M. Rachoux, who appears to have carefully examined the same facts, gives a preference to the explanation of the phenomenon by means of a softening of the heart; (*Dict. de Méd.* t. xvii. Art. *Rupture;*) and yet when we consider that in the opinion of this gentleman, every apoplexy is preceded by softening, we may, after all, consider his opinion as not being essentially different from that of M. Cruveilhier. Respecting the opinion of M. Cruveilhier, that apoplexy never affects the walls of the *right* ventricle, and that when rupture of them takes place, it depends on an atrophy, a fatty degeneration, or a gelatinous softening of the heart, I am not prepared to say how far it is well or ill founded. The recorded facts appear to justify it no farther than by this consideration—that the rupture of this ventricle being infinitely more rare than that of the left, it seems to indicate a different cause.—(*M. L.*)

Rupture of the heart occurs much more frequently in old than in young persons. Out of nineteen cases collected by Dr. Townsend, (*Cyc. of Pract. Med.* Art. *Rupture of the Heart,*) all the patients were above sixty years of age, except one of fifty-eight. It would likewise appear to be much more prevalent in the male than in the female sex, as out of twenty-five cases noticed by the same author, sixteen were men. The experience of all pathologists confirms the assertion of Laennec, that rupture of the heart occurs much more frequently in the left ventricle than in any other situation.

The following synopsis, which I have drawn from the writings of Morgagni, Ploucquet, Testa, Bertin, Rostan, Blaud, Otto, and from cases published by Adams, Townsend, &c. &c., gives a view of the seat of the lesions in fifty-seven cases:

Left Vent.	Right Vent.	Both Vent.	Right Aur.	Left. Aur.
32.	13.	3.	7.	2.

All these cases occurred spontaneously, or after slight exertion, except ten; of which number six were the immediate consequence of blows on the chest, two occurred during coitus, one in a fit of epilepsy, and one in an epileptic paroxysm. Of the cases from blows, three had the rupture in the right ventricle, two in the left ventricle, and one in the right auricle; of the two cases from coitus, one was in the right, the other in the left ventricle, and this was also the result in the two other cases.

LITERATURE OF RUPTURE OF THE HEART.

1689. Bohn, (J.) De renunciatione vulnerum. *Lips.* 8vo.
1731. Salzmann, (J.) De subitanea morte a sanguine in pericardium effuso. *Argent.*
1733. Morand, Mém. de l'Acad. Roy. des. Sc. 1732. *Par.*
1764. Mummsen, Diss. de corde rupto (with eng.) *Lips.*
1769. Ludwig, (C. G.) De dextra cordis auricula rupta. (Ad. Med. Pr. I.) *Lips.* 8vo.
1788. Murray, Diss. de corde rupto. *Upsal.* 4to.
1803. Olmi, (A.) Mem. di una morte repentina cagionata dalla rottura del cuore. *Fir.*
1804. Pohl, De ruptura cordis (with eng.) *Lips.* 4to.
1808. Brera, Di una straordinaria rottura di cuore. *Verona.* 8vo.
1820. Rostan, (L.) Mém. sur les ruptures du cœur. (Nouv. Journ. de Méd.) *Par.* 8vo.
1820. Blaud, Mémoire sur les ruptures du cœur. (Bibliothèque Méd. Aout.) *Par.*
1820. Patissier, Dict. des Sc. Méd. (Art. *Rupture du Cœur.*) t. 49. *Par.*
1825. Rochoux, (L.) Diss. sur les ruptures du cœur. *Par.*
1827. Desormeaux, Dict. de Méd. (Art. *Rupture.*) t. 17. *Par.*
1834. Townsend, Cyc. of Pract. Méd. (Art. *Rupture of the Heart.*) vol. iv. *Lond.*
Morgagni, De caus. et sed. morb. Ep. 26, 27. 64.

A very great number of single cases of rupture of the heart are recorded by authors, a considerable part of which are noticed in the memoirs above quoted, or referred to in the *Bibliotheca* of Ploucquet (*Cor ruptum*) and in the elaborate notes to Otto's *Pathological Anatomy*, Part II. Sect. xix.—*Transl.*

CHAPTER XV.

OF THE ACCUMULATION OF FAT ABOUT THE HEART, AND OF FATTY DEGENERATION OF THIS ORGAN.

In medical writings we find many examples of the heart being overloaded with fat in a surprising manner, to which condition of the organ various symptoms, and even the sudden death of the individuals, were attributed. M. Corvisart thinks that an enormous accumulation of fat around the heart may, in fact, produce such effects, although he has met with no permanent derangement of any kind, in persons whose hearts were found to be much loaded in this manner. I have also met with a great many cases of hearts, similarly overloaded, in subjects who had died of various diseases. In these, the fat was deposited between the muscular substance of the heart and the investing pericardium, and chiefly at the union of the auricles and ventricles, at the origin of the great vessels, and along the tract of the coronary arteries, also along the two edges and at the apex of the heart. Sometimes the posterior face of the right ventricle is covered by this deposition in its whole extent; a circumstance which rarely has place on the surface of the left ventricle.

The fatter the heart is, the thinner, in general, are its walls. Sometimes these are extremely thin, being reduced almost to nothing, especially at the apex of the heart and the posterior side of the right ventricle. On examining ventricles affected in this manner, they present the usual appearance internally; but on cutting into them from without, the scalpel seems to reach the cavity without encountering almost any muscular substance, the columnæ carneæ appearing merely as if bound together by the internal lining membrane. In these cases the fat does not appear to be the product of degeneration of the muscular fibres, as these can be separated by dissection. Sometimes, indeed, portions of fat penetrate deeply between the muscular fibres; but, even in this case, the distinction between the two tissues is still very marked, and they are confounded by no mutual gradation of colour and consistence. It would seem probable from this, that, from pressure or some unknown aberration of the powers of nutrition, the muscular substance has wasted in proportion as the investing fat has increased. It might be reasonable to expect rupture of the heart from an affection of this kind; such an instance, however, has never occurred to me.* Very commonly we find, in such subjects, a large quantity of fat in the lower part of the mediastinum, particularly between the pericardium and pleura. This fat, much reddened by its small vessels, and covered by its pleura, assumes a gross resemblance to the figure of a cock's comb, and is firm. The fat surrounding the heart, on the contrary, is almost always of a pale yellow colour, and is only of moderate consistence. I have not observed, nor yet has M. Corvisart, any symptoms that could directly denote the existence of an accumulation of this sort. I apprehend it must exist in a very great degree before it gives rise to any serious complaint. This is not, therefore, the condition I wish to denote by the name of *Fatty degeneration of the Heart.*

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* In several of the cases of rupture recorded by authors, the heart was prodigiously fat. See, for instance, one of Morgagni's cases, Ep. xxvii.; one of M. Bertin's cases, p. 50; and two cases by Adams, in the Dub. Hosp. Rep. vol. iv.—*Transl.*

Fatty degeneration of the heart is an actual transformation of the muscular substance into a substance possessing all the chemical and physical properties of fat. It is precisely similar to the fatty degeneration of the muscles observed by Haller,[*] and Vicq-d'Azyr.[†] I have only met with it in a small portion of the heart at one time, and only towards the apex. In these portions the natural red colour is superseded by a pale yellow, like that of a dead leaf, and is, consequently, nearly the same as that of certain states of softening of the heart. This change of structure appears to proceed from without inwards. Near the internal surface of the ventricles, the muscular texture is still very distinguishable; more externally, it is less so; and still nearer the surface it becomes gradually confounded, both in colour and consistence, with the natural fat of the apex of the heart. In such cases, however, even the portions that still retain most of the muscular character, when compressed between two pieces of paper, still grease these very much. This character distinguishes this species of degeneration from simple softening of the organ. I have never found rupture of the heart attributable to this change, any more than to the morbid accumulation of fat. It is denoted by no symptoms with which I am acquainted.[‡]

CHAPTER XVI.

OF CARTILAGINOUS OR BONY INDURATIONS OF THE MUSCULAR SUBSTANCE OF THE HEART.

I HAVE never met with ossification of the muscular substance of the heart, and only a small number of examples of this are on record. M. Corvisart found, in the case of a man who died of hypertrophy of the left ventricle, the whole apex of the heart, and, more partially, the columnæ carneæ of the left ventricle converted into cartilage. (Op. Cit. p. 171.)

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[*] Opusc. Pathol. [†] Tom. v. Edit. de Moreau.

[‡] I stated in the last note (p. 582) M. Cruveilhier's opinion that rupture of the [illegible] be owing to the fatty degeneration of the muscular substance; [illegible] observe that he has adduced no example of the sort, and of the [illegible] there is not one calculated to bear out this opinion, except [illegible]loup.—(*M. L.*)

Haller (Opusc. Pathol.) found, in a child, whose heart was of the natural size, the inferior part of the right ventricle, the most muscular parts of the left auricle, and the sigmoid valves of the aorta and pulmonary artery, in a state of ossification. Filling, in the case of an asthmatic subject, met with ossification of one of the fleshy columns of the left ventricle.* M. Renauldin has published, in the Journal de Méd. for January, 1816, a very interesting case of the same kind. The patient was a man thirty-three years of age, much addicted to study, and subject to violent palpitations on the slightest motion. "On applying the hand to the region of the heart a sort of motion of the ribs was felt, and even the slightest pressure produced very acute pain, which lasted long after the pressure was discontinued. On examining the body after death the heart was found extremely hard and heavy. On attempting to cut the left ventricle, great resistance was found, owing to the total conversion of the muscular fibre into a sort of *petrifaction*, having in some places a sandy character, in others a resemblance to saline crystallization. The grains of this species of sand were very contiguous to each other, and became larger towards the interior of the ventricle. They were continuous with the columnæ carneæ, which were themselves converted into a similar substance, but still retained their original form, only much enlarged. Some of these sabulous concretions were of the size of the point of the little finger, and resembled small stalactites shooting in different directions. The ventricle was thickened. The right ventricle and great arterial trunks were sound. The temporal and maxillary arteries, and also a part of both the radial arteries, were ossified." In the case of a subject with ossification of the pericardium, Burns found some of the fleshy columns transformed into bone.†

I am persuaded that a bony or cartilaginous induration, as extensive as that in the three cases above mentioned, might be recognized by the stethoscope by means of a considerable increase and likewise a particular modification of the sound of the heart. I believe cases of this kind are among those in which the sound of the heart may be heard at some distance from the patient. We frequently find on the interior surface of the ventricles, especially the left, cartilaginous scales continuous with the lining membrane, and apparently deposited between it and the muscular substance of the heart. These plates were exactly of the same kind as those described by me in another place,* and are generally of small extent. We ought to consider as a variety of these incrustations, that evident thickening and milk-white colour of the inner membrane of the left ventricle, which are frequently met with, over a great extent, in the case of hypertrophy. I have never seen this after it had reached the point of ossification: but an example of this kind is described in Kreysig's work, vol. ii. p. 43. The ossification of the auricle, some examples of which we find in the works of Burns, Kreysig, and Bertin, ought also, in my opinion, to be considered as the result of these incrustations —at least in the majority of cases. I have met with several cases of this, over a small extent; but have never seen ossification of the muscular substance of the auricles.

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* Hufeland's Journ. B. xv. p. 155.

† This is not only an imperfect but an incorrect account of the case of Margaret Henderson described by Burns, (p. 129,) and which is one of the most extraordinary on record. In this, "the whole extent of the pericardium covering the ventricles, and the ventricles themselves, except about a cubic inch at the apex of the heart, were ossified, and firm as the skull." Many cases of partial ossification are on record. —*Transl.*

CHAPTER XVII.

OF OTHER ACCIDENTAL PRODUCTIONS FOUND IN THE HEART.

Of all the organs of the body the heart is perhaps the least liable to these productions, if we except ossifications. Three or four times only have I met with tubercles in the muscular substance of the heart. In the *Sepulchretum* we meet with only a small number of instances of tumours in this organ, which seem to belong to the class of cancers or of tubercles.† Columbus (De re Anat. l. xv.), in examining the dead body of Cardinal Gambara met with two hard tumours of the size of an egg in the substance of the left ventricle. Marianus, in the case of a young man, communicated by him to Morgagni, found numerous small tubercles implanted on the outer surface of the right auricle; (Epist. lxxvii. 13;) and similar tubercles, but much larger, were found in the mediastinum, at the roots of the lungs, in the lymphatic glands and cellular substance of the abdominal and thoracic parietes. M. Recamier informs me that he found the heart partly converted into a scirrhous substance, like lard, in a case in which there was, moreover, cancerous tumours in the lungs. Within these last four years, I have met with two cases of the encephaloid cancer of the heart. In one of these, the cancerous matter formed small masses, of the size of filberts, or less, in the muscular substance of the ventricles; in the other it was deposited in layers of one to four lines thick, along the coronary vessels, between the pe-

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[*] Dict. de Sc. Méd. *Art.* Cart. Accident.

[†] Lib. ii. sect. vii. obs. cxii.; sect. i. obs. ii.; lib. iii. sect. xxi. obs. xxiii.

cardium and heart. MM. Andral and Bayle have lately published three similar observations in the *Revue Méd.* for May, 1824, and some others have been published more recently still. From these facts it may be concluded, that cancerous productions may be developed in the heart, as in other organs, under two principal forms,—that of isolated tumours, and that of *interstitial deposition*, which last constitutes what is commonly termed *transformation* of the organ into a cancerous substance. This affection rarely exists without there being similar productions in other organs, particularly the lungs.

Serous cysts occur very seldom in the heart. When met with, they are most commonly found between the muscular substance and the investing serous tunic. Examples of this kind are related by Ballonius, Houlier, Cordœus, Rolfinckius,[*] Thebesius,[†] Fanton,[‡] Valsalva and Morgagni.[§] Dupuytren met with serous cysts in the walls of the right auricle, and projecting into its cavity so as to augment it to the size of the whole remaining portion of the heart.[||] Morgagni relates a case from which it appears that vesicular worms may be developed in the heart. In the body of an old man, who had died of an acute disease, and who had never exhibited symptoms of cardiac disorder, he found a cyst of the size of a small cherry, half-buried in the walls of the left ventricle, and when cut into, discharged "a small membrane, containing whitish mucus, amid which one *particle* was observed as hard as tendon." (Epist. xxi. 4.) It is impossible to mistake, in this description, the characters of the genus *cysticercus*. The small *membrane* full of mucus was the caudal vesicle, and the hard *particle*, was the body doubled upon itself. From the size we may presume that it was the *cysticercus finnus* of Rudolphi; a presumption the more probable that it is almost the only species that has hitherto been found in the human body.[¶]

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[*] *Sepulchret*. lib. iii. sect. 36.; Ibid. *De Morb. Intern.* lib. ii. cap. xxix.; Ibid. sect. xxi. obs. xxi.; Ibid. sect. viii. obs. vi.

[†] Ephem. Nat. Cur. cent. iv. obs. cxv.

[‡] Obs. Anat. Méd. xi. and xv.

[§] De Sed. et Caus. Epist. iii. 26; Epist. xxv. 15.

[||] Journ. de Méd. t. v. p. 139.

[¶] Respecting the various morbid productions and degenerations mentioned in the present chapter, much more ample information is to be found scattered through the writings of the older and modern pathologists, in the systematic collections of cases of morbid anatomy, and in the periodical journals and transactions of societies. For the fullest and most accurate collection of references to the individual cases, I refer the reader to the elaborate and very valuable *Compendium of Pathological Anatomy*, by professor Otto, for an excellent translation of which the profession in this country are much indebted to Mr. South. In this work, in the annotations to § 183, p. 288, are pointed out the sources whence ample information may be procured on all the subjects referred to by our author, viz. *Indurated Tumours*, *Steatomes*, *Hydatids*, *Serous Cysts*, *Calcareous Tumours*, *Tubercles*, *Encephaloid Cancer*, and *Carcinoma*.—*Transl.*

CHAPTER XVIII.

OF CARTILAGINOUS AND BONY INDURATION OF THE VALVES AND LINING MEMBRANE OF THE HEART.

SECT. I.—*Anatomical Characters of Induration of the Valves.*

THE mitral and aortal valves are subject to the growth of cartilaginous or bony productions, which increase their thickness, alter their shape, and obstruct, sometimes almost totally, the orifices in which they are placed. The tricuspid and sigmoid valves of the pulmonary artery are much less subject to these alterations, although they are not quite exempt from them, as Bichart thought. Morgagni found (Epist. 37) in the case of an old woman, both these partially indurated. He likewise found, in a young woman, the sigmoid valves of the pulmonary artery agglutinated by means of a cartilaginous induration, partly ossified, so as considerably to diminish the diameter of the artery. In this patient the foramen ovale was likewise open, and the symptoms of the blue disease were present. Vieusens, Hunauld, Bertin senior, and Horn, have met with instances of bony or cartilaginous indurations on the valves of the cavities of the right side. (See Kreysig and Bertin.) But of all the cases of this kind, none is more extraordinary than one observed by Crüwell.* In this, the tricuspid and mitral valves were cartilaginous in several places; small bony concretions existed in the vena cava; laminæ of bone extended from the base of the right auricle under the internal membrane of the ventricle, some of the columnæ carneæ of which were ossified; and, finally, laminæ still thinner and narrower, bony or cartilaginous, penetrated the muscular substance of the two ventricles. A small hollow globular body, perforated by two openings of a partly cartilaginous and partly bony texture, was fixed between the valves of the pulmonary artery. This body seemed to have been recently detached from the interventricular septum, and still retained at one end some marks of its adhesion. The pericardium was attached to the heart and contained some ossified points. Corvisart twice observed the cartilaginous induration of the base of the tricuspid valve, and another is recorded in his journal, which occurred in the person of an English general.† Burns likewise gives a case of partial ossification of the tricuspid valves, (Op. Cit. p. 31,) and Bertin informs us, that, in the course of twenty years, he has four times met with a cartilaginous induration of the same parts. He has published one of these cases (Obs. LIV.) "in which the laminæ of the tricuspid valve, hard, thickened, and united together by their edges, formed a sort of cartilaginous septum, perforated in its centre by an opening, scarcely capable of admitting the point of the little finger." I have myself sometimes met with slight cartilaginous incrustations both at the base and point of the tricuspid valves, and also of the sigmoid of the pulmonary artery. Once only have I seen these advanced to the stage of ossification; and it ought to be observed that in almost all the cases alluded to, the induration of the valves on the right side was only cartilaginous. It is especially in cases of preternatural communication between the cavities of the heart, that the valves of the right side have been found affected. Bertin relates a case of this kind communicated to him by M. Louis (Obs. LVII.) in which the tricuspid valve was partly ossified, and the sigmoid valves of the pulmonary artery formed a sort of fibrous ring hardly two lines and a half in width. In this case there was a small opening, two lines wide, between the right ventricle and the origin of the aorta. In another case observed by M. Bertin himself (Obs. LVI.) the foramen ovale was unclosed, and the mouth of the pulmonary artery was "closed by a horizontal septum, pierced by an opening two and a half lines in width." From these facts it appears probable that the action of the arterial blood has a great influence over the production of bone in the heart, an opinion rendered still more probable, by the consideration of the great frequency of these in the valves of the left side of the heart. I have sometimes noticed small cartilaginous incrustations both on the base and at the extremities of these valves.*

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* De Cord. et Vasor. osteogenosi in quadragenario observ. *Halæ*, 1765.

† Journ. de Méd. t. xix. p. 468.

The cartilaginous induration of the mitral valve is sometimes confined to the fibrous bands found in its base. In this case it has the appearance of a very smooth, though unequal ring, lessening the orifice in which it is situated. This sometimes has the consistence of perfect cartilage, sometimes only that of imperfect cartilage. Similar incrustations sometimes are met with in other parts of these valves; but those at the basis or points are commonly thickest. The bony indurations present the same characters as to situation, and are still more unequal as to thickness. Though formed in the interior of the valve, they often project from it quite uncovered; and are so rough as to have led some authors to consider them as carious. These ossifications are never perfect bone; they are whiter and more opaque, more fragile, and evidently contain a greater proportion of phosphate of lime. On this account they have been frequently named *stones* or *calculi*. In fact, they frequently bear a striking resemblance to small pieces of stone, of very irregular surface, recently broken; more especially when they are very rough, and have pierced and destroyed, over a great extent, the membrane which originally invested them. When they are situated in the floating extremities of the valve, these are occasionally united together, so as to reduce the orifice to a mere slit, which will, sometimes, scarcely admit the blade of a knife or a goose-quill. M. Corvisart found the orifice between the auricle and ventricle reduced to a channel three lines wide, and bent like the canalis caroticus, from the thickening of the ossified mitral valve. Sometimes, though rarely, the tendinous cords of the mitral valve are affected in the same manner; and M. Corvisart in one case found the whole of one of its pillars ossified. (Op. Cit. p. 212.*)

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* Dr. Latham has found the right valves affected in one-third of the cases in which the left were; Dr. Hope has found the proportion smaller, one in four or five.—*Transl.*

The ossification of the sigmoid valves of the aorta may commence, like that of the mitral, in their base or their loose edges: at least the greater frequency of occurrence, and the greater thickness of these two parts, and the comparative rarity of ossification in the intermediate portions, seem to indicate the ossification as beginning in these points. When in the loose extremity, the ossification seems most frequently to originate in the small tubercles known by the name of the *corpora sesamoidea.*

When the ossification is confined to the floating edge of the valves, or when the base, though ossified, is little thickened, the valve may still perform its functions, provided the middle portion of it be still sound. But when the ossification is extensive, the valves grow together, and get incurvated, either towards their concave or convex side, so as to acquire the appearance of certain shells. In this state they are immovable, being either fixed on the side of the aorta, or in the orifice of the ventricle. Very frequently, of the three valves one is bent in a direction opposite that of the two others. In one case, M. Corvisart found all the three valves ossified in their closed position so as to leave merely an extremely small slit for the passage of the blood. The evil of this was partly obviated by one of the valves, although ossified and very thick, still retaining, at its base, sufficient mobility to allow an increase of one or two lines to the orifice during the action of the heart. (Op. Cit. p. 220.) In one case (Obs. LIII.) M. Bertin found the three sigmoid valves ossified, and one of them enlarged to the size of a pigeon's egg.†

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* In one of my cases of diseased heart, (*Original Cases*, p. 133,) *three of the pillars* of the mitral valve were completely ossified through their whole extent, with the exception of a minute portion at each extremity, which was semi-cartilaginous or fibrous and flexible; an arrangement which seemed absolutely necessary to admit the usual contraction of the ventricle.—*Transl.*

† One of the most remarkable cases of valvular disease of the heart that I have met with, is that of Mary Horn, recorded in my *Original Cases*, p. 178; and the diagnosis of which (as far as the valves were concerned) was very accurately established by means of the stethoscope. This girl died shortly after the last report given in the published case. The organic lesions found on dissection were the following:—the right auriculo-ventricular opening was converted into a circular foramen (capable of

SECT. II.—*Signs of Induration of the Valves.*

The symptoms of ossification of the mitral valve are little different from those attending the same affection of the sigmoid.[*]

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admitting the thumb) with smooth rounded cartilaginous edges; the left auriculo-ventricular opening had undergone precisely the same change, only the orifice on this side admitted the point of the finger with difficulty; the sigmoid valves of the aorta were cartilaginous and united together, so as to leave a mere slit just capable of admitting a large goose-quill. Both auricles were dilated; the right in an extreme degree; the left ventricle was enormously hypertrophied, with diminution of its cavity; the right very slightly hypertrophied but dilated. The whole heart was of an immense size.—*Transl.*

[*] Our author here, as elsewhere, in his zeal for physical diagnosis, overlooks the ordinary or general *symptoms* of the disease. In the present case of disease of the valves, the symptoms are certainly, at best, only equivocal indications of the pathological state of the heart; still they are far from being valueless as signs, whether taken singly or in conjunction with those afforded by the stethoscope. In briefly noticing these in this place, I am almost compelled to avail myself of the observations of Dr. Hope, as they are so strictly in accordance with my own, that if I did not formally quote his work I should have the appearance of borrowing, without acknowledgment. (See his *Treatise on Diseases of the Heart*, and the article *on Diseases of the Valves of the Heart*, in the Cyclopædia of Pract. Med.)

"Whether the disease of the valves be cartilaginous, osseous, or consist of vegetations, the general symptoms are the same, if the degree of contraction be equal. These are, cough, copious watery expectoration, dyspnœa, orthopnœa, frightful dreams and starting from sleep, turgescence of the jugular veins, lividity of the face, anasarca, injection of almost all the mucous membranes, passive hemorrhages, especially of the mucous membranes, engorgement of the liver, spleen, &c. and congestion of the brain, with symptoms of oppression sometimes amounting to apoplexy.

"The peculiar and distinctive symptoms of valvular disease are the following:—When the disease is combined with hypertrophy or dilatation, as is commonly the case, the symptoms are more severe than those of hypertrophy or of dilatation alone, the paroxysms of palpitation and dyspnœa in particular, being more violent, more obstinate, and more easily excited. The action of the heart is irregular. This, it is true, may sometimes be the case in hypertrophy and in dilatation, but here it is an accidental, not an essential character. The pulse may in valvular disease be small, weak, intermittent, irregular, and unequal; and it may even be small and weak while the heart is giving a violent impulse—a contrast which affords one of the strongest presumptions of valvular disease. The characters of the pulse just described, are most marked in contraction of the mitral valve; and, if its contraction be great, they are all invariably present; for as, in this case, the left ventricle is not freely supplied with blood, it is not stimulated to contract at the natural intervals and with suitable energy. A slight contraction of the mitral, (when, for instance, the diameter of the aperture is not diminished more than a quarter of an inch,) does not necessarily produce an unsteady pulse, as it still allows of an adequate supply of blood to the ventricle. When, however, the circulation is hurried, the pulse generally becomes unsteady. Contraction of the aortic valves must be very great to render the pulse small, weak, intermittent, and irregular. I have never seen it possess these characters in any marked degree unless the valves were either soldered together by cartilaginous degeneration, or more or less fixed by ossification in the closed position, so that the aperture was only a limited chink. An induration the size of an ordinary pea, has little effect on the fulness, firmness, and regularity of the pulse, and slighter degrees of contraction appear to have no effect on it whatever. The pulse is less irregular when the valvular contraction is on the right side, than when it is on the left: it is not so small and weak from a contraction on the right side as on the left, and contraction of the tricuspid valve causes more irregularity than contraction of the valves of the pulmonary artery.—Pain in the region of the heart is another symptom of disease of the valves. It is true that palpitation may occasion pain though there be no disease of the valves, and I have frequently met with it from this cause in hypertrophy and dilatation. It is likewise true that palpitation may occasion pain

According to M. Corvisart the principal sign of the former lesion is "a peculiar rustling sensation (*bruissement*) perceived on the application of the hand to the region of the heart." This peculiar sensation is nothing else than the *purring-thrill* already described. It is assuredly very frequently observed in the case of ossification of the mitral or sigmoid valves when this exists in a high degree; but, as I formerly stated, it may exist when these valves are perfectly sound, and it is almost always absent when the induration is not so extensive as materially to obstruct the orifices. The bellows-sound is a much more constant sign: it accompanies the contraction of the left auricle when the mitral valve is affected, and that of the ventricle, when the induration is in the sigmoid. But even this is wanting when the alteration is not extensive, and as it is, moreover, very common when the heart is perfectly sound, we must lay no stress on it as a sign, unless it be combined with other circumstances calculated to confirm the diagnosis. Accordingly, when the sound of the bellows, rasp, or file, persists in the left auricle, either continuously or interruptedly, for several months;—when it is found only there, and exists even in the greatest quietude; when it is scarcely lessened by venesection, or, when lessened, if it still leaves behind it a degree of roughness in the sound of the auricle, —or, yet more, when the purring-thrill co-exists with this;—we may be assured that the left auriculo-ventricular orifice is contracted.[*] If the same phenomena occur, under similar circumstances, in the left ventricle, we may be equally certain that the aortal orifice is contracted.

Three or four times, during the last four years, I have discovered this lesion, by means of these signs. Three similar examples, equally verified by dissection, are recorded in M. Bertin's work (Obs. 49, 50, 51;) and a fourth is given in the collection of cases published by Dr. Forbes. (Case VII.) But if these phenomena exist only for a time, although as much as two or three months,—if they accompany the increase of any other nervous or organic disease of the heart, we must not depend upon them as indications of the lesions now in question; since all the facts formerly recounted prove that these sounds are not produced (as might be imagined at first) by the passage of the blood

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though there be no disease of the heart whatever; I have often found it in hysterical females, and in nervous men. But it is when the valves, the coronary arteries, or the commencement of the aorta, are indurated and inelastic, that pain occurs most frequently and with the greatest severity. Sometimes it is little more than an indescribable sense of obstruction or oppression in the præcordial region; but, in other cases, it is an intense lancinating or tearing pain, felt across the præcordia or scrobiculus cordis, (where it might be mistaken for inflammation of the stomach,) and occasionally extending, with a sense of numbness, down the left arm to the elbow and sometimes to the fingers. Pain of this description has acquired the name of *angina pectoris*."—*Transl.*

[*] This contraction is more frequently owing to ossification of the mitral valve than to any other cause.—*Author.*

over a rough or rugged surface, but to the spasmodic energy requisite in the muscular contraction to overcome the obstacles opposed to it. It follows, therefore, that any other cause besides diminution of the size of the orifices, which occasions contraction of the heart, is equally capable of giving occasion to the bellows-sound and purring-thrill: and it is fair to admit that, in the first edition of this work, I laid too much stress on these two phenomena as signs of valvular disease.*

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* It is true that we must not attach too much importance to the bellows-sound as a sign of disease; but I am of opinion (as I formerly stated, p. 522.) that we ought to have more confidence in the *sound of the rasp* accompanied by the *purring-thrill*. I am surprised that Laennec did not make a distinction, in this respect, between the two. The bellows-sound very rarely, and only at intervals, assumes the sound of the rasp. When the latter exists, we may be sure that there is an obstruction to the course of the blood from disease of the valves. It is proper to remark, however, that the converse is not always true: there may be obstruction without any sound of the rasp. In several instances I have found the aortal valves ossified in subjects in whom the auscultation of the heart produced no anomaly, except perhaps increased impulse. I do not, however, recollect having found the mitral valve ossified, without a change in the character of the second sound.—(*M. L.*)

The following observations by Dr. Hope, on the important points noticed in the above note, merit the greatest attention:—

"Bellows-murmur sometimes exists in the heart though there be no disease of the valves; namely, in nervous persons, in cases of reaction from excessive loss of blood, of pericarditis and adhesion of the pericardium, and of hypertrophy with dilatation. Murmur from these causes may easily be distinguished from that of valvular disease, by the following criteria:—When, from nervous excitement, very common in hysterical females, it may be known by its being intermittent, ceasing when the nervous exacerbation subsides and the action of the heart becomes calm. When from reaction, it subsides with the cessation of that phenomenon. When from pericarditis or adhesion of the pericardium, it may be known by the presence of signs of those affections. When from hypertrophy with dilatation, it may be known by its diminishing or ceasing when the action of the heart is calmed, as by repose, venesection, abstinence, &c. &c. Contrasted with the above, the distinctive characters of valvular murmur are, that it is not universal over the heart, but confined in a great measure to the part corresponding to the valve affected; that it persists without intermission for an indefinite length of time, even though the heart be kept in a state of perfect calm; and that it is often of the filing, rasping, or sawing kind; whereas murmurs from other causes have almost always the softness of the bellows-sound. This murmur has a *soft* character, like that of *bellows*, when the contraction has a smooth surface which does not greatly break the stream of blood, as when the morbid deposition consists of cartilage, fibro-cartilage, or vegetations. But the murmur is rougher or more grating, like that of a *file* or *rasp*, when the deposition has a rugged, hard surface, as when it is osseous. Murmurs are more *hollow* when they are deep seated, as, for instance, in the auriculo-ventricular orifices; and more *hissing* or *whizzing* when they are superficial, as in the aortic orifice, more especially in the pulmonary orifice, and the ascending aorta. The hollowness of the sound is referable to its remoteness and its reverberation through the chest. The *sawing* murmur is almost identical with the filing or rasping; it is only less grating, and on a higher key. The *musical bellows-murmur* is a perfect note like whistling or cooing. In the case of a patient who applied to me for 'a noise in the chest,' I heard it at the distance of two feet. In a case precisely similar, which occurred to Dr. Elliotson, there was a very large and long vegetation in the mitral valve. As *purring tremor* has the same origin as bellows and other murmurs, it often accompanies them; though, as it requires a greater degree of disease for its production, this is not always the case. It may be occasioned by obstruction, not only of the semilunar, but also of the mitral and tricuspid valves, and in the latter cases it may accompany either the first or the second sound. When accompanying the first, it proceeds from regurgitation through the valve; and when accompanying the second, it results from the impeded passage of the blood from the auricle into the ventricle during the ventricular diastole. It

A slight degree of cartilaginous or bony induration of the valves may exist for a long time without any visible alteration of the health, or even of the action of the heart; and even by proper measures of precaution and by seasonable bleedings, we may frequently preserve for a long time the life of individuals, who present every sign of considerable contraction of the orifices. The following case is a proof of this.

CASE XLV.—A very muscular young man, aged sixteen, came into the Necker Hospital in February, 1819, complaining of oppression on the chest and palpitation; symptoms which had seized him suddenly, together with hæmoptysis and epistaxis, two years before. These symptoms were relieved at the time, by rest; but returned as often as he made any considerable degree of exertion. He presented the following symptoms on coming into the hospital: respiration and resonance good over the whole chest; the hand applied to the region of the heart feels the pulsation strongly, and accompanied with the *purring* vibration. This vibratory sensation is not continuous, but returns at regular intervals. The stethoscope, applied between the cartilages of the fifth and seventh ribs, gives the following results:—contraction of the auricle extremely prolonged, accompanied with

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rarely accompanies the second sound; because, as we conceive, the diastolic current is seldom strong enough to produce it. When from disease of the mitral valve, it is not perceptible in the pulse."—(Cyc. of Pract. Med. vol. iv.)

For by far the completest and most accurate account of the physical diagnosis of diseases of the valves, I refer the reader to Dr. Hope's Treatise on Diseases of the Heart, and to his very valuable article just quoted (*Valves of the heart, diseases of,* in the fourth vol. of the Cyclopædia of Practical Medicine. It is very satisfactory to learn from so experienced an auscultator as Dr. Hope, not only that Laennec's mistake (for such I think we must now admit it to be) respecting the cause of the second sound scarcely vitiates the conclusions deduced by him as to the particular parts affected, but that the signs discovered by him are of more value than he himself believed. "The accession of auscultation (says Dr. Hope) to the other means of diagnosis has rendered it possible to distinguish valvular disease with almost complete certainty; a certainty, it may be remarked, much greater than was supposed by the illustrious author of auscultation himself; for he did not give their full value to preternatural murmurs as signs of disease of the valves, in consequence of supposing that such murmurs were produced by a spasmodic contraction of the muscular fibre of the heart, and even of the arteries...... Laennec laboured under another disadvantage: he attributed the *second* sound of the heart to the auricular contraction; whereas, according to the experiments of the writer, it is referable to the ventricular diastole. The substitution of this view of the heart's action for that of Laennec, fortunately, does not falsify any of his physical signs, except one, viz. that 'loudness of the second sound indicates dilatation of the auricles:' it does not, to adduce a single instance, invalidate the fact that murmur of the second sound indicates disease of the auriculo-ventricular valve; but it affords a rational explanation of all the phenomena noticed by Laennec, and renders various others available as signs, which to him were inexplicable and therefore useless."—(Loc. Cit.)

The following brief extracts from the same work of Dr. Hope, give an accurate but incomplete view of the diagnostics of the particular affections: for a fuller account I must refer to the original article and to his treatise. "*Signs of disease of the aortic valves.*—One of the murmurs above described is heard during the ventricular contraction about the middle of the sternum, and is louder here than elsewhere. It is more or less hissing or whizzing, from being superficial, and it accordingly conveys the idea of being near to the ear. When a murmur of this kind is louder along the tract of the ascending aorta than opposite to the valves, and is, at the same time a dull but strong sound exactly like that produced by a file on wood. This sound is attended by a vibration sensible to the ear, and which is evidently the same as that felt by the hand. Succeeding this, a louder sound and a shock synchronous with the pulse point out the contraction of the ventricle, which occupies only one fourth the time, and has something harsh in its sound. Under the lower end of the sternum the contractions of the heart are quite different. Here the impulse of the right ventricle is very great, its contraction accompanied by a very distinct sound, and being of the ordinary duration; viz. twice as long as that of the auricle. The sound of the auricle is somewhat obtuse, but without any thing analogous to the vibratory character of the left. The action of the heart is audible below both clavicles, on both sides, but feebly, especially on the right. Over the whole sternum, on the right side and below the left clavicle, the contractions of the heart have the same rythm as at the end of the sternum. On the left side, on the contrary, the whizzing sound of the left auricle already described is much feebler than in the left precordial region. From these signs the following diagnostic was given—*Ossification of the mitral valve, slight hypertrophy of the left ventricle; perhaps slight ossification of the sigmoid*

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peculiarly superficial and hissing, it proceeds from disease of the aorta itself. As a murmur from this source often extends to the situation of the valves, it might easily lead to the supposition that they also were diseased, and it is sometimes very difficult to ascertain positively that they are not. A murmur may accompany the second sound when there is regurgitation through the aortic valves, and its source may be known by its being louder and more superficial opposite to those valves than elsewhere. *Signs of disease of the mitral valve.*—When this valve is contracted, the second sound loses, on the left side, its short, flat, and clear character, and becomes a more or less prolonged bellows-murmur. When the valve is permanently patescent, admitting of regurgitation, the first sound likewise is attended with a murmur. These murmurs are louder opposite to the mitral valve, (viz. at the left margin of the sternum, between the third and fourth ribs, i. e. about three or four inches above the point where the apex of the heart beats,) than elsewhere. They are also more hollow than murmurs of the aortic valves. *Signs of disease of the aortic and mitral valve conjointly.*—The murmurs above described as characteristic of each, exist simultaneously in the situation of each. If the murmurs of the first sound be of a different *species* in the two situations—if, for instance, the murmur of the aortic valves be of the bellows kind, and that of the mitral resemble filing or rasping, it is still easier to determine that both valves are diseased. *Signs of regurgitation through the mitral valve.*—These signs are a murmur with the first sound, louder in the situation of this valve than of the aortic; and a weak pulse, even though the impulse of the heart be violent. It is generally unsteady also. *Signs of disease of the pulmonic valves.*—The signs are the same as those of disease of the aortic valves, with this difference, that the murmur seems *close* to the ear, and is equally hissing as in disease of the ascending aorta. Disease of the pulmonic valves is so rare that it ought never to be suspected unless the signs described are extremely well marked, or unless there be patescence of the foramen ovale, or some other preternatural communication between the two sides of the heart—states, which experience has proved to be in general accompanied with contraction of the pulmonic orifice. *Signs of disease of the tricuspid valve.*—They are the same as those of disease of the mitral, except that the murmurs are loudest opposite to the valve: viz. at the middle part of the sternum, opposite to the inter-space between the third and fourth ribs, and a little to the right of the mesial line. As this valve is very seldom affected, the practitioner must be very cautious in pronouncing it diseased, especially as the pulse does not afford the same evidence as in contraction of the mitral orifice."—(Loc. Cit.)—*Transl.*

valves of the aorta; great hypertrophy of the right ventricle. The pulse, in this case, was pretty strong and very regular, and all the functions natural, only the sleep was habitually disturbed by frightful dreams, and the lad could not use any severe exercise, nor even walk rather fast, without being attacked by strong palpitations and a feeling of suffocation. Four venesections, after intervals of a few days, gave much relief. After the first, the pulse became weak; and immediately after each bleeding the *purring vibration* became imperceptible to the hand, and the whizzing of the auricle changed from the sound of a *file* to that of a *bellows*, the valve of which we keep open by the hand; the shock of the right ventricle continued to be very strong. This patient left the hospital after a month, being, in his own opinion, pretty well. He came afterwards several times to consult me, and was bled occasionally. I saw him once more in 1822. I found that he had abandoned his laborious occupation of gardener, and had an easy place as the servant of a priest. Since his change of situation he has been much easier: but his former symptoms still exist, although in a slighter degree.

Ossification, and yet more cartilaginous induration of the valves of the left side of the heart, is by no means uncommon in a slight degree; but it is extremely rare in such a degree as materially to impede the circulation, and thereby to give indication of its existence. This may seem contradictory of the assertion of Corvisart, who considers the cartilaginous or bony induration of the valves, especially the aortal, as the most common organic affection of the heart. The difference of opinion, in this case is, however, only apparent. I by no means consider ossification of the valves as uncommon. I can even give my own testimony to the correctness of Corvisart's opinion, at the time he wrote, having been his pupil during the period in which the greater number of his cases were collected. At that period, in the space of about three years, I observed, in his clinic, more cases of extensive ossification of the valves, than I have done in the whole twenty years that have succeeded.*

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* It is chiefly in the case of diseased valves, although by no means exclusively in this case, that those severe paroxysms of dyspnœa occur, which have been denominated *cardiac asthma*. The exciting cause of these paroxysms may be either an excess or a deficiency of blood in the vessels of the lungs arising from the morbid condition of the heart: either of these states may, no doubt, give rise to the spasmodic stricture of the bronchial muscles in which an asthmatic paroxysm most frequently consists: and the former, at least, may readily produce analogous results, through the influence of mere congestion, without any muscular spasm. This form of asthma, or, to speak more properly, of dyspnœa, has been much more fully treated by Dr. Hope than by any preceding author; and for ample details respecting it, I refer the reader to his *Treatise on Diseases of the Heart*, and to the article on *Disease of the Valves* in the 4th. vol. of the Cyclopædia of Pract. Med. The following extracts from this article give the more distinctive characteristics of the cardiac asthma in its milder and severer forms. "The time of the accession is less regular than in ordinary asthma, being more dependent on the state of the heart, which is liable to accidental excitement, from a variety of causes, at any moment. The fit, however, in ordinary

This is not the only organic disease, of a chronic kind, which exhibits such irregularity of occurrence at different times. Among others, cancer of the stomach has appeared to me much less fre-

asthma, is, on the whole, more apt to supervene during the evening, or early part of the night......The patient awakes, generally with a start, in a fit of dyspnœa, accompanied either with violent palpitation, or a distressing sense of anxiety in the præcordia and great constriction of the chest, as if it were tightly bound. He is compelled to assume a more erect posture, and intensely desires fresh, cool air; the respiration is wheezing and performed with violent efforts of all the muscles of respiration both ordinary and auxiliary. The inspirations are high and accompanied with apparently little descent of the diaphragm, and the expirations are short and imperfect. The surface is chilly, the extremities are cold, and the face is pale and sometimes livid. In cases in which the pulmonary congestion is only *temporary*, as in hypertrophy, either simple or with dilatation, there is no cough beyond a few slight and ineffectual efforts, producing little or no expectoration; and in such cases the fit subsides as soon as the engorgement of the heart and great vessels is relieved, which nature generally effects in two or three hours or less, by determining the blood to the surface and creating diaphoresis. In some instances we have known this termination to be regularly accompanied with a copious secretion of pale urine and a purging alvine evacuation. The pulse, though at first full, strong, and bounding, may, during the worst of the paroxysm, become feeble and small, and the sound and impulse of the heart may be diminished; and this in cases even of hypertrophy; for the organ, being gorged to excess, is incapable of adequately contracting on its contents.

"Such is the nature of an asthmatic fit when the pulmonary congestion is only temporary: the case is different when it is *permanent*, as in valvular disease and in some extreme cases of dilatation. For then, there is often violent cough in suffocative paroxysms, accompanied, at first, with difficult and scanty expectoration of viscid mucus, but ending gradually in a copious and free discharge of thin, transparent, frothy fluid, occasionally intermixed with blood. This evacuation, by disgorging the pulmonary capillaries, affords great relief to the cough and dyspnœa. As, however, the transudation of the matter to be expectorated into the air-passages, and its final elimination, are slow processes, paroxysms of this description are much more protracted than those of dry asthma from hypertrophy. They frequently last five or six hours, and I have known them persist, with only occasional remissions, for two, three, or more days. During the attack, the pulse is quick, small, and weak, often irregular and intermittent. In other forms of asthma the circulation through the heart is sometimes little disturbed."

In the severer form of what has been termed cardiac asthma, the dyspnœa is greatly more urgent and the sufferings are more extreme. It will be seen, however, from the following excellent description of this state by Dr. Hope, that it is to confound the legitimate boundaries of disease to denominate the case one of asthma.

"Incapable of lying down, he is seen for weeks, and even for months together, either reclining in the semi-erect posture supported by pillows, or sitting with the trunk bent forwards and the elbows or fore-arms resting on the drawn-up knees. The latter position he assumes when attacked by a paroxysm of dyspnœa—sometimes, however, extending the arms against the bed on either side, to afford a firmer fulcrum for the muscles of respiration. With eyes widely expanded and starting, eye-brows raised, nostrils dilated, a ghastly and haggard countenance, and the head thrown back at every inspiration, he casts round a hurried, distracted look, expressive at once of fright, agony, and supplication; now imploring, in plaintive moans, or quick, broken accents and half-stifled voice, the assistance already often lavished in vain; now upbraiding the impotency of medicine; and now, in a fit of despair, drooping his head on his chest, and muttering a fervent invocation, for death to put a period to his sufferings. For a few hours—perhaps only a few minutes—he tastes an interval of delicious respite, which cheers him with the hope that the worst is over, and that his recovery is at hand. Soon that hope vanishes. From a slumber fraught with the horrors of a hideous dream, he starts up with a wild exclamation that 'it is returning.' At length, after reiterated recurrences of the same attacks, the muscles of respiration, subdued by efforts of which the instinct of self-preservation alone renders them capable, participate in the general exhaustion and refuse to perform their function. The patient gasps, sinks, and expires."—(Loc. Cit.)—*Transl.*

quent, of late years. The same is true of different species of accidental productions, usually denominated cancer, a single case of which I have not seen for the last nine years, although I had done so several times during each of the preceding years. In like manner during the last nine years I have only met with one case of that variety of incipient tubercles, called *miliary granulations* by Bayle, but which he mentions as of common occurrence. The same remark applies to many kinds of nervous diseases, such as mania, epilepsy, common colic, and even the painter's colic. I am aware that the variations mentioned may sometimes depend on other circumstances, unconnected with the actual relative frequency of occurrence of the diseases in question,—as in the case when either accident or superior reputation brings more cases of one kind to any particular physician; yet I am convinced that the inequality alluded to is found too constant and too striking in hospital practice, not to depend on causes of a more general kind.

SECT. III.—*Bony and cartilaginous Induration of the internal membrane of the Heart.*

The membrane which lines the interior of the ventricles is so very thin, that its very existence has been denied by some anatomists. In the state of disease, however, it becomes distinctly evident, and is easily demonstrated by dissection. It is common enough to find this membrane slightly and irregularly thickened on a part of the walls of the left ventricle, particularly around the orifices. In these places it acquires a certain degree of opacity, and such a milky-white or slightly yellow colour, as renders it very perceptible. The texture of the diseased portions is like that of cartilage, but less consistent. In these cases I am of opinion that the indurations are not owing to an actual thickening of the membrane, but to the formation of an imperfect accidental cartilage of a flattened form, between the adherent surface of the membrane of the muscular fibres of the heart. This position of the accidental productions of this kind, whether cartilaginous or bony, which I have termed incrustations, appears to be the result of a general law applicable to the development of all the bodies of this kind met with on the surface of other membranes and the organs they invest, such as the pleura, peritoneum, lungs, spleen, the arteries, &c. Even the incrustations of the valves of the heart seem to originate in the duplicatures of these; and in their earlier stage, we can separate, in some places, the inner membrane from their surface. This I have also sometimes effected in the case of thickening of the lining membrane of the left ventricle. I have never found the indurated portions of this membrane arrived at the state of bone; but Crüwell's case, already mentioned, appears to furnish an instance of the kind, and some others have been recorded, but not very accurately. Kreysig gives one unquestionable instance (Vol. iii. p. 43.) When we come to consider the similar case of incrustations of the aorta, we shall state what is known relative to their production.

CHAPTER XIX.

OF CONCRETIONS OF BLOOD, COMMONLY TERMED POLYPI, OF THE HEART AND BLOOD-VESSELS.

It was formerly customary to attribute to the polypous concretions of the heart observed after death, the symptoms which truly depend on the enlargement of that organ. The incorrectness of this opinion is proved by the fact, that these concretions are very frequently found in persons who have never exhibited any symptoms of disease of the heart: in truth, they are met with in three-fourths of dead bodies. Perhaps even the existing epidemic constitution contributes as much to their production as the particular condition of the individual; at least I have met with them much more frequently, and much larger, at certain times than at others. It is equally erroneous to believe, with some modern authors, that polypi never begin to form until after death, or, as Pasta or Morgagni thought, that they may begin to form merely in the last struggle. Many facts prove that these concretions can be formed during life. The phenomena of aneurisms alone prove this; and, besides, we sometimes find veins and even arteries of considerable size completely obstructed by concrete fibrine.

Haller found the carotid artery and internal jugular vein quite obstructed by very firm concrete fibrine in one case, and the inferior vena cava in another.[*] Vinckler,[†] Stancari and Bonaroli, have met with similar cases in the vena cava, the emulgent, epigastric, and iliac veins.[‡] I have myself observed, in a consumptive subject, an obliteration of the inferior cava for the space of four fingers' breadth. This obstruction was produced by a whitish fibrinous concretion which filled the whole caliber of the vein. The exterior layers of this concretion were like the buffy coat of the blood, only much firmer, and adhered strongly to the inner coat of the vein: the inner portions were, on the contrary, of a yellowish colour, more completely opaque, and of a friable character, like certain kinds of cheese; and exactly resembling the decomposed fibrine frequently met with in aneurismal sacs. I have since met with two cases precisely similar, except that in these, the concretions were more or less coloured by recently coagulated blood: this appearing to have still circulated, although imperfectly, around the coagula, which adhered to the interior of the vein in some points only. In another case I found a similar obstruction in the carotid artery; and, in a third, I observed the whole of the vessels of the pia mater, in a circumscribed space about the size of the palm of the hand, injected with a similar concretion. None of these individuals had exhibited symptoms indicative of the presence of such concretions, nor did there exist any obstacles to the course of the blood which might account for them: we must, therefore, attribute them to spontaneous coagulation of the blood, and reasoning, *a priori*, therefore, nothing is more probable than that the blood must coagulate during life, in the heart also; more particularly at the very close of life, when the circulation is performed only in an irregular and imperfect manner. Many similar cases have been recently recorded, particularly by Hodgson, Burns, Kreysig and Bertin. M. Bouillaud has published a memoir in which he proves that many partial dropsies are owing to similar concretions in the veins;* and M. Velpeau has recently presented to the Academy of Medicine two remarkable instances of the same kind. In one of these the vena cava, and several veins opening into it, were filled with a concretion only slightly attached to their sides, yet partially organized, and containing small encephaloid tumours, which were likewise found in other parts of the body.†

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[*] Opusc. Pathol. obs. 23, 24.

[†] Dissert. de Vasor. lithias.

[‡] Morgagni, Epist. 64.

Most of the authors above mentioned attribute the formation of these venous concretions to inflammation; and Burns and Kreysig seem even to lean to the opinion, that the polypi of the heart may have the same origin. I shall afterwards examine the grounds of this opinion; at present I shall content myself with the fact, that the blood may coagulate in the vessels during life. M. Corvisart was, therefore, correct in distinguishing polypi into such as are of a formation posterior to death, and such as have been produced while the individual was still alive. These two kinds are easily distinguished from each other. The former, or those of recent formation, exhibit merely a slight layer of whitish opaque fibrine, partially enveloping the coagula of blood contained in the heart and large vessels. This fibrinous or buffy layer never completely surrounds the coagula, and does not adhere to the parietes of the heart or vessel in which it is contained. Sometimes this layer is thicker; and in this case, especially if the subject is dropsical, it is semi-transparent and tremulous like jelly. On the other hand, the polypi of more ancient formation are of a much firmer consistence (being nearly equal to that of muscle, but with less force of cohesion) and adhere more or less strongly to the walls of the heart. In the ventricles and auricular sinuses, this adhesion is partly caused, no doubt, by the intertexture of the concretion with the columnæ carneæ; but, even here, the principal part of the attachment is independent of any mechanical structure of the parts. These concretions are of a more distinctly fibrinous texture than are the recent formations or the buffy coat of the blood, and they are, further, of a pale flesh or slight violet colour; while the more recent are, as already mentioned, of a white or yellowish colour. Sometimes, amid a mass of inspissated fibrine, we meet with a small clot of blood quite isolated. The surface of the concretions is dotted with specks of blood, which cannot be removed by washing: sometimes these penetrate only a quarter of a line into the polypus, and appear as if destined to form the vessels afterwards to be developed in them: sometimes they penetrate deeper, and already assume the aspect of vessels. Occasionally, even, I have found in these polypi small coagula of blood of a rounded shape, and already enveloped by a distinct membranous layer, evidently the rudiments of the coats of a vessel. I have not met with large polypous concretions in a more advanced state of organization than this; a circumstance which is, no doubt, owing to their speedily proving fatal from their size. We shall see, however, in the chapter on *excrescences in the heart*, that concretions of a smaller size may attain a perfect organization.

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* Archiv. gén. de Méd. t. ii. and v.

† Revue Méd. Mai, Juin et Juill. 1826. Since then my brother has published in the same journal (Oct. 1828) a case still more striking than that of M. Velpeau.— (*M.L.*)

These ancient concretions are found most frequently in the sinus of the right auricle, and in the right ventricle. When in the former, they completely obstruct its cavity, but in the ventricle they only double in thickness its walls, (thereby lessening its cavity,) and obstruct the descent of the tricuspid valve. In this case, one may remove all the loose coagulated blood without injuring the concretion; it is even possible that this might be mistaken for the natural boundaries of the cavity. The columnæ carneæ to which these concretions are attached, are commonly perceptibly flattened; a circumstance which, of itself, would prove their formation to be anterior to death; as a considerable length of time must necessarily be requisite to produce this effect. M. Corvisart was the first, as far as I know, to observe this flattening of the columnæ: in the case noticed by him they were quite *effaced.** I have not met with any case so strongly marked as this; but it is by no means rare to find cases wherein the thing is very perceptible. The two kinds of concretions just described, are clearly formed before death. The circumstance related from Corvisart, seems conclusive on this point, in respect of the second species. And in regard to the first, we may observe, that the softest and most recent concretions are never exactly like the buffy coat of blood abstracted from the vessels.

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* I have seen the columnæ quite *effaced* where there was no polypus.—*Transl.*

There is still a third species of concretion, evidently more ancient than those just described,—of a formation, perhaps, several months anterior to the patient's death. These are found adhering to the walls of the heart, sometimes so firmly, as only to be detached by scraping with the scalpel. Their consistence is less than that of those just noticed; being not at all fibrinous, and resembling rather a dry friable paste, or a fat and somewhat soft cheese. They have lost the slight semi-transparency of recently concreted fibrine, and resemble in every respect those layers of decomposed fibrine met with in false aneurisms. I have only met with concretions of this kind on the walls of the auricles, and their sinuses.

When the polypi of the heart are of a large size, I conceive they may be recognized by the stethoscope. In several cases I have prognosticated their existence from the following signs; which, nevertheless, I dare not propound as certain, as they are not founded on a great many facts:—In the case of a patient, whose heart had been acting regularly, if the pulsations suddenly become anomalous, obscure, and confused, so as not to be analyzed, we may suspect the formation of a polypus. If the disordered action exists on one side of the heart only, we may consider the thing as almost certain. For instance, if we find the pulsations of the heart, under the sternum, confused and tumultuous, although the day before they had been regular, we may look upon the formation of a polypus in the right cavities as very probable; and the more so, if the contractions of the left ventricle, explored between the cartilages of the fifth and sixth ribs, are more distinct.*

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* LITERATURE OF POLYPUS OF THE HEART.

1639. May, (Ed.) A most certaine and true relation of a strange monster or serpent found in the heart of John Pennant, gent. *Lond.* 4to.
1654. Pissini, (Seb.) Epist. de cordis polypo (App. ad lib. de diabete.) *Mediol.* 4to.
1669. Malpighi, (Marc.) De viscerum structura. de polypo cordis. *Lond.* 8vo.
1710. Gohl, De cordis polypis ex neglectis hæmorrhoidibus. *Berl.* 4to.
1724. Alberti, (Mich.) Diss. de polypo cordis. *Hal.* 4to.
1726. Goetz, (G.) De polyposis concretionibus in pectore. (Hall. B. M. Pr. II.) *Alt.* 4to.
1736. Hoffmann, (F.) De præcavenda polyporum generatione (Opp. Sup. ii.) *Hale.* 4to.
1737. Pasta, (And.) Epist. de motu sanguinis et de cordis polypo. *Berg.* 4to.
1742. Huxham, (J., *M.D.*) Concerning polypi taken out of the hearts of sailors. (Phil. Trans. vol. xlii.) *Lond.* 4to.
1764. Goetzke, (J.) Casus Med Pract. de polypo cordis. *Spiræ.* 4to.
1776. Negri, (   ) Theses de polypis præcordiorum. *Ticini.* 8vo.
1786. Pasta, (Jos.) De sanguine et sanguinis concretionibus. *Berg.*
1789. Maincourt, De sanguinis concretionibus in corde. (Doering I.) *Par.* 8vo.
1800. Chisholm, (Col., *M.D.*) Account of the epidemic polypus at Grenada in 1790. (Ann. of Med. vol. v.) *Edin.*
1804. Tiedemann, Diss de cordis polypis. *Marb.* 8vo.

CHAPTER XX.

OF INFLAMMATION OF THE INTERNAL MEMBRANE OF THE HEART AND LARGE VESSELS.

Inflammation of the inner membrane of the heart and large vessels appears to me to be very rare, notwithstanding the contrary opinion of some modern observers. The correctness of my opinion will appear, I think, from an examination of the different morbid appearances, which have been considered as proofs of the inflammation in question. These appearances I shall now notice in order.

1. *Redness of the membrane.*—In examining dead bodies we frequently find the inside of the aorta and pulmonary artery uniformly reddened, as if stained by the blood they contained. This colouring is of two kinds,—either bordering on scarlet, or of a brown or violet hue. Frequently the scarlet colour has its seat exclusively in the inner membrane, as, when this is removed, the tunic beneath is found of the natural colour: at other times, however, the redness penetrates, more or less deeply, the fibrinous coat, and occasionally even reaches the cellular. This colour is quite uniform, as if painted, without any trace of vascularity, only sometimes more intense in one place than another. Sometimes this stain diminishes progressively from the origin of the aorta, but frequently it terminates quite abruptly with irregular edges. Sometimes, in the middle of a very red portion, we find a circumscribed spot, retaining the natural white colour, like the whiteness produced by pressure with the finger on an erysipelatous skin. When the aorta contains very little blood, the redness only exists in the part in contact with this, forming a streak like a ribband. The origin and arch of the aorta are the situations most commonly reddened, and, with them, the sigmoid and mitral valves. Sometimes nearly the whole arterial system presents the same colour. When the pulmonary artery is affected, its valves,

1810. Gärtner, Diss. de polypo cordis in specie infantum (with engr.) Würceb.
1817. Flormann, Bemerkungen ueber polypen in herzen (Svenska Handlingar, vol. iv.) *Stockh.* 8vo.
1818. Nasse, Zur kenntniss der herzpolypen (Horn. Archiv. Iul. Aug. 1818) *Berl.* 8vo.
1818. Meckel, (A.) Beiträg zur lehre der herzpolypen (Meckel's Archiv. No. 2.) *Berl.* 8vo.
1820. Meissner, (F. L.) Ueber die polypen in der verschiedenen hohlen, &c. *Leips.* 8vo.
1820. Monfalcon, Dict. des. Sc. M. (Art. *Polype*) t. xliv. *Par.*
1827. Breschet, Dict. de Méd. (Art. *Polype,*) t. xvii. *Par.* 8vo.
1830. Harty, (W., *M.D.*) On the polypi of the heart. (Dub. Med. Trans. N. S. vol. i.) *Dub.* 8vo.
1832. Hope, Treatise on diseases of the heart. *Lond.* 8vo. *Transl.*

as well as the tricuspid, are commonly in the same state. The lining membrane of the ventricles and auricles is frequently colourless, when the valves are deeply stained; not unfrequently, however, the auricle participates in the affection, and approaches the colour of the valves: more rarely the ventricle exhibits a similar colour, or rather browner or violet. Sometimes the auricles and ventricles are alone coloured; and it is worthy of notice that, in this case, the heart is found full of blood, and the arteries are nearly empty. This redness is attended by no sensible thickening of the part, and it entirely disappears after a few hours' maceration.

Corvisart has slightly noticed this affection; and has avowed his ignorance of its nature and cause. Frank, who observed it through the whole tract of the arteries, considered it as the cause of a particular and uniformly fatal fever; and this opinion has been adopted by Kreysig, Bertin and Bouillaud. The first and most natural idea respecting the redness of any part naturally white, is, that it is the result of inflammation. But mere redness, without thickening of parts, does not sufficiently characterise this state; while the abrupt termination and exact circumscription presented by the redness in certain cases, seem not easily to accord with the nature of inflammation; and give rather the idea of impregnation by a coloured liquid, which had been poured irregularly over the membranes, or which had only touched it partially, on account of its small amount.

I am extremely doubtful whether this kind of redness gives rise to general symptoms sufficiently constant or severe to indicate its presence. I have found it in subjects who died of very different affections, and have never been able to foretell its existence by any constant signs. A rather prolonged agony, in subjects still vigorous yet cachectic, from diseased heart or otherwise, has appeared to me frequently to accompany this affection. In cases of this kind, the blood is never strongly coagulated, and the body most commonly affords marks of decomposition.

The second species of redness of the large vessels has a quite different appearance, being, in place of a bright red, of a violet or brownish hue. It is also usually extended at the same time to the aorta, pulmonary artery, valves, auricles, and ventricles. This variety is not so exactly confined to the lining membrane as we find the muscular substance of the auricles and ventricles, and even the fibrinous coat of the aorta and pulmonary artery, participating in it, at least partially. I have more particularly found this variety of colouring in subjects who died of putrid fevers, emphysema of the lungs, and disease of the heart. All these individuals had remained long in a moribund condition, with great dyspnœa: in all, the blood was very fluid, evidently altered, with signs of premature decomposition in the body. It is accordingly, most frequently in summer that we meet with this condition of parts, and in subjects that have been dead upwards of twenty-four hours. Both kinds of redness, particularly the last, are accompanied with a greater or less degree of softening of the heart, and an increased humidity of the arterial tunics,—the consequence, most commonly, of incipient putrefaction.

Bouillaud and Bertin have adopted the opinion of Frank respecting the inflammatory character of the arterial redness; and yet, if we examine the numerous cases adduced by them in support of this opinion, we shall find them very conformable with the observations made above. Of twenty-four cases, eleven were severe continued fevers, or other affections, in which there existed a manifest putridity of the fluids; and the other thirteen were almost all consumptive patients. In the latter cases, the condition of the blood is most commonly not noticed; but it has been generally remarked, that the redness in question has seemed coincident with a remarkable degree of fluidity of the blood. It is also worthy of notice, that most of these dissections were performed in summer, and upwards of thirty hours after death.

Having been struck with this coincidence of redness of the membrane, and alteration of the fluids, and incipient decomposition of the body, I began to doubt (four years since) whether the former were not merely the result of imbibition of blood after death. With the view of determining this point I made the following experiment, which I have since repeated a great many times. In a subject, which exhibited at the time no mark of decomposition, and in which the aorta was healthy and white throughout, I removed this vessel, filled it with blood from the body, and having passed a ligature round its two extremities, deposited it in the stomach of the subject. At the expiration of twenty-four hours I laid the artery open, and found its internal tunic precisely of the scarlet colour above described, and which was not lessened by repeated washings. This experiment does not always succeed so completely. If the blood employed is too much coagulated, the imbibition is obtained with much difficulty, feebly and slowly. If we employ blood but half-coagulated, and particularly such as we express from the lungs, we produce the scarlet colour. If we employ blood which is very fluid, especially if mixed with serum, we obtain a more or less deep purple or pale colour. If we fill the artery only one-half or one-quarter, the part in contact with the blood alone exhibits the discoloration. If the coats of the artery are firm and elastic, the experiment succeeds with difficulty, and after a long time, (72—80 hours,) and the tinge is never deep. On the other hand, if the tunics are soft, supple and humid, the colouring is speedily diffused through their whole depth. The experiment succeeds much better in summer than winter, and the more readily, as the decomposition is rapid; the colorization, however, is complete, long before the aorta yields any disagreeable smell.

Boerhaave and Morgagni (Ep. xxvi. 36) were acquainted with these kinds of redness, and attributed them to the congestion of blood in the last stage of diseases, accompanied with much dyspnœa. Hodgson has remarked, that the redness of the arteries seems, in many cases, to be the result of a simple tincture, as we frequently find spots of a deep red colour in the parts corresponding to a coagulum of blood. He adds, that the same appearance is observed in arteries that have been long exposed to the air in the dissecting room. This last observation is perfectly correct, but applies to a quite different circumstance. Every white tissue exposed in a humid place assumes a red colour, although never of the depth above described. This will happen, in the course of twenty-four hours, to the mucous membrane of the stomach and intestines, the peritoneum, pleura, &c. But in this case the phenomenon depends evidently on the *transudation* of the blood contained in the capillaries; and the effect can be promoted by gently scraping the surface of the membrane with the scalpel.

From what goes before, I think we must conclude, that the redness of the lining membrane of the heart and large vessels cannot, in any case, be considered as proving the existence of inflammation; on the contrary, that we may consider it as being the result of a process taking place in the dead body, or in the last agony, in every case wherein we find it coinciding with a prolonged and suffocative agony—a manifest change in the fluids, —and a more or less marked state of decomposition. This is a state of parts to which I wish particularly to call the attention of pathologists, so that they may avoid confounding the *causes* with the *effects* of diseases. The discrimination of the congestion of the capillaries from inflammation is often difficult, but it is of the utmost importance that it should be made. In the case now in question, we may be justified in suspecting inflammation, when the redness is accompanied with swelling and thickening of the part, and with an extraordinary development of capillaries in the middle coat of the vessel; but I am not sure that even these characters united would prove the existence of inflammation, in the case of a body that was considerably œdematous.*

2. *Pseudo-membranous exudation.*—The formation of a layer of coagulable lymph on the inner surface of the heart and vessels is the most unequivocal sign of inflammation of this membrane; and, indeed, with the exception of ulceration, is the only certain one. Several instances of this kind have been observed of late

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* For some valuable observations and experiments on the subject of redness of the inner coat of the blood vessels, I refer to a Memoir of MM. Rigot and Trousseau, in the *Archives gén. de Méd.* t. xii. The result of the researches of these gentlemen corroborates the views of M. Laennec.—*Transl.*

years. Baillie found the tricuspid valve affected in this manner. Farre met with a similar affection in the aorta of a person who had died of pleurisy and pericarditis. Burns observed a layer of lymph on the inner surface of the right auricle in one instance, and in the left auricle in another. In a third case, this author observed, a little above the mitral valve, "a tendinous septum, partially ossified and perforated in its middle by an opening with wrinkled edges, capable of admitting the little finger." This partition was parallel with the mitral valve, divided the auricle in two portions, and could only be considered as the product of inflammation. Bertin, in the case of a man affected with hypertrophy and pericarditis, found the lining membrane of the aorta reddened and covered with a half coagulated and reddish pellicle of albumen (obs. ii.). I have myself, in like manner, occasionally observed false membranes of small extent, strongly attached to the walls of the auricles, in subjects affected with other diseases of these organs, particularly excrescences. Liquid pus has never been found in the heart and arteries, except in the case of ulceration, and then only in very small quantity. And indeed it is not easy to conceive how this could be otherwise, considering the rapidity of the circulation, which must carry off the pus as soon as it is formed.

3. *Ulceration.*—The lining membrane of the heart is so thin, that we can hardly admit its ulceration, independently of that of the subjacent tissue. Several cases of undoubted ulceration of the interior of both arteries and veins are recorded by authors, and particularly by Hodgson and Kreysig; and such examples would be much more numerous if we admitted all those which have been given as such, both by ancient and modern observers. But the majority of these cases were evidently nothing else but the separation of the bony incrustations of the aorta, which will be noticed hereafter. Small pustules full of pus have been sometimes met with beneath the inner membrane of the aorta, and which have discharged their contents into its cavity; and it is probably in this manner that the real ulcers of the aorta are formed, being the consequence of inflammation of the middle coat of the arteries, or of the fine cellular substance which unites this to the inner coat. This seems the more probable from the fact, that in the inflammation of all membranes, pus is formed on their external, and not their adherent surface, as in the case of peritonitis, pleurisy, croup, &c. With these pustular eruptions (which are very rare) the bony spiculæ of the inner membrane of the aorta, or rather the detachment of these, have been sometimes confounded; the hollow left by their removal being filled up by lymph, frequently intermixed with phosphate of lime. Frequently the edges of these morbid spots are reddened to a small distance round; an appearance which I am disposed to attribute rather to the

imbibition of blood than to inflammation; a state which is indicated neither by the presence of pus, nor by any local or general symptoms.

4. *Polypous concretions.*—Are these the product, and, consequently, a proof of the existence of inflammation of the inner membrane of the heart and arteries? Kreysig has answered this question in the affirmative; and Burns seems sometimes inclined to the same opinion. If this opinion is well founded, we must admit the gratuitous hypothesis that the inflamed membrane acts upon the blood, and produces its coagulation. We may indeed conceive that the blood itself performs an active part in inflammation; that it is, in fact, as the ancient pathologists imagined, susceptible of inflammation; and, to say the truth, I am far from rejecting this view of the subject, however old and obsolete, as it is much more reconcilable with many established facts, than are the modern theories. But these are not the views of Kreysig, Burns, and others who have adopted their opinions. Their theory seems to rest chiefly on the cases, in which there is close adhesion and continuity of substance between the polypous concretions and the lining membrane of the heart and vessels. But there are many objections to their mode of explaining the fact:—for instance; the intimate adhesion mentioned is but seldom met with, and only in the most perfectly organized polypi:—the very great majority of concretions found on dissection, are either quite loose in the heart and vessels, or are simply in contact with the inner membrane, or interlaced with the columnæ carneæ; the history of the cases proves that all the polypi were, in the first instance, unattached;—on removing a small coagulum from the orifice of a vein, which had been recently opened, a small polypous concretion has followed it, and this in the case where no sign of inflammation existed;—it is not in young plethoric subjects, full of life, and eminently disposed to inflammation, that these concretions are especially found, but, on the contrary, in the last agony of different diseases, particularly those of a chronic kind, and such as have produced cachexy, marasmus, and great debility, and which have been accompanied by local or general obstacles to the circulation: that the actions of the animal organs are not necessary to produce coagulation of the blood, or to separate its fibrine, is proved by the production of the inflammatory crust on that evacuated by the lancet; and, lastly, these very polypi are often found in the heart and large vessels of men and animals, which have been suddenly destroyed in perfect health. On the other hand, we can conceive two ways in which an organized polypus may become attached to the parts with which it is in contact. In the first place, it may occasion an effusion of coagulable lymph by its own local irritation. It may be remarked, in corroboration of this hypothesis, that, in the case of obstruction of the veins, the more recent concretions are not ad-

herent, but only those which are proved by their firmness and comparative dryness, and otherwise changed condition, (and also sometimes by the contraction of the vein,) to be of ancient formation. In the second place, polypous concretions formed before death, are evidently possessed of life as well as the blood, and retain it for some time after extravasation, a remarkable proof of which I formerly noticed in the organization of fibrine in the bronchi in a case of hæmoptysis.

Other examples of the same kind are furnished in the case of effusions of blood on the serous membranes, all of which prove that fibrine separated from the blood and coagulated, is in the living body equally susceptible of organization with the coagulable lymph effused in inflammation. And it may be here remarked that it is not perhaps satisfactorily demonstrated, that the production of a plastic lymph, susceptible of organization and of conversion into a tissue similar to that in which it is formed, necessarily pre-supposes the presence of inflammation. The reunion of wounds made by a fine cutting instrument, sometimes takes place without any obvious signs of inflammation. In these cases, as soon as the hæmorrhage has ceased, there supervenes a discharge of a viscid transparent lymph, which is evidently the medium of union employed by nature; and it is worthy of notice, that, in cases where inflammation exists, the flow of this lymph precedes it by several hours. The greater number of tumours of considerable size, which form slowly in the lungs, ovaries, or other parts of the abdomen, are attached to the neighbouring parts by serous or cellular laminæ of greater or less extent. These laminæ, unquestionably, in some cases originate in local pleurisies or peritonitis, but in others, the closest and most accurate observation can detect no symptom of previous inflammation. The filaments and flocculi of albumen, more or less concrete, occasionally found in the water of the most atonic dropsies, and the deciduous membrane formed in the early period of pregnancy, admit, in my opinion, of a similar explanation. It would be to fall into a strange abuse of words and to adopt an unpardonable laxity of reasoning, to find inflammation in every case in which we observe only one of its anatomical characters,—viz. plastic lymph susceptible of organization. Future observation may, probably, hereafter ascertain the physical and perhaps chemical characters which distinguish the lymphatic concretions produced by inflammation, from those which are formed without it. In the present state of our knowledge I think it may be remarked, that those formed under the influence of evident inflammation have a considerable degree of firmness and nearly complete opacity from their very origin, and also a yellow colour like that of pus; and it is from these characters, as well as from their disposition to become softened to the consistence of pus, when they are not converted into an organized tissue, that I have thought proper to designate them, in this work, by the term *concrete* pus.

From all that precedes I think we may deduce the following conclusions:—1. The remora of the blood, in consequence of obstruction to its course, suffices in itself to produce coagulation, and to determine the formation of a coagulum of organizable fibrine. Every cause capable of occasioning this remora, particularly mechanical obstruction to the circulation and repeated and prolonged faintings, appears to me sufficient to produce this effect. 2. The coagulation of blood in the vessels seems to produce in some cases, particularly in the veins, a true inflammation, accompanied by the formation of a false membrane. 3. It appears certain that occasionally, and especially in the veins when the circulation is slow, an inflammation of the inner coat of these may occasion coagulation of the blood, in the vicinity of the lymph effused by the inflammation. 4. Pus absorbed in great quantity by a vein, may in several ways affect the concretion of blood—by rendering it less liquid from simple admixture,—by coagulating it by a chemico-vital action,—and by exciting inflammation of the containing vessel. It is well known that nothing is more common than to find the veins in the vicinity of a cancerous breast, or in inflammation of the uterus after parturition, filled with pus, either pure or mixed with blood, sometimes fluid, at other times more or less inspissated, and occasionally of the degree of consistence of the contents of an atheromatous tumour.*

I conceive that we may, in many cases, distinguish during life the simple coagulation of blood in the vessels from that which is the consequence of inflammation. I on one occasion met with two cases, at the same time, which led me to entertain this opinion. One of these was the case of a woman affected with inflammation of the median vein, accompanied by erysipelatous swelling of the fore-arm, excessive pain of the part, high fever and other very threatening symptoms. The second occurred in the person of a magistrate, who came to consult me for a slight lameness which he had felt in the left thigh and leg for three or four days. I found the internal saphena hard as a chord, over its whole extent, and as large as the little finger over its superior half. Pressure produced hardly any uneasiness; and indeed he had come to see me on foot, being desirous of trying the effect of exercise on his complaint. Looking upon the case as an example of coagulation of blood without inflammation, I recommended one bloodletting, rest, and friction of the part, and I found the vein returned to its natural suppleness in the course of eight days. The woman, whose case I formerly mentioned when treating of pneumonia, was cured in like manner, in the space of a very few days, by means of tartar emetic in large doses. Facts of this kind seem further to lead us to believe, that blood coagulated from any cause whatever, may be returned in the course of the circulation, by the absorption of the veins, and thence be expelled the system; as there seems to me no other mode of accounting for the restoration of the circulation in the affected vessel.

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* Hodgson and Travers have published some cases of this kind, which are, indeed, by no means rare. An additional consequence of the presence of too much pus in the blood, from venous absorption, is the production of inflammation in different organs, and especially the lungs, which run rapidly into suppuration. It is from this circumstance that the subjects of surgical operations and those labouring under extensive suppurations, are frequently cut off by peripneumonies, which, according to the observation of M. Cruveilhier, are usually *lobular*, that is, commencing in several points at once. This, in my opinion, is the mode in which we must explain the occurrence of metastasis of pus, at least in the majority of cases.—*Author.*

CHAPTER XXI.

OF EXCRESCENCES ON THE VALVES AND INTERNAL WALLS OF THE HEART.

THERE are two very distinct varieties of this affection. The one, first noticed by Riverius* has been described by M. Corvisart under the name of *excrescence of the valves*; the other, which does not appear to have been hitherto described, I shall notice under the name of *globular excrescence.*

1. *Warty Excrescence.*—The first might be very well named warty excrescences, inasmuch as they are extremely like warts, especially those of venereal origin on the parts of generation. Like these, the excrescences in the heart sometimes resemble small strawberries, in their form and tuberous surface; at other times they are elongated into the form of a small cylinder or cord, and, occasionally, they are so short and so crowded together, as merely to give to the parts on which they are situated a rough or rugged surface; more frequently, however, they are either isolated or ranged in a single line along the loose, or the attached border of the valves. I have never observed any, longer than three or four lines. But we occasionally meet with them sufficiently numerous and voluminous to present a rough resemblance to the comb of a cock.

The colour of these excrescences is sometimes whitish like that of the valves, and hardly so opaque; more commonly they are either wholly or in part tinged with a reddish or light violet colour. Their texture is fleshy, like venereal warts, only of somewhat less firm consistence; although this is variable. They adhere immediately to the subjacent parts; sometimes so strongly as to be only separable by incision; more commonly they are removable by scraping with the blade, or even the handle of the scalpel. In the latter case, the excrescences are soft, of a yellowish-white colour, very humid, and somewhat resembling fat. The venereal origin of these excrescences, entertained by Corvisart, appears to me very improbable, when we consider their rarity and the frequency of venereal complaints, and when we meet with them, as we do, in individuals who, in all probability, never had this disease.

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* Bonet, Sepulch. l. ii. sect. viii. obs. 24.

Whatever may be the remote cause of these bodies, the manner of their formation seems to be more explicable. In dissecting the more voluminous excrescences, it has always appeared to me that their texture was exactly like that of the more compact polypous concretions, only firmer. Frequently we observe in their centre a purple or sanguineous tint; and sometimes I have even found a very small but distinct coagulum of blood. From these circumstances I am led to consider such excrescences as merely small polypi, organized by the same process which transforms the false albuminous membranes into true adventitious membranes, or into cellular substance.* In like manner as Corvisart, I have only met with these excrescences in the following situations, viz. the mitral, tricuspid, and sigmoid valves, and (much more rarely) the interior of the auricles, especially the left. In general they are more common in the left than the right side of the heart.

Kreysig attributes the formation of these excrescences to inflammation, an opinion in which he has been followed by Bertin and Bouillaud. Besides the reasons adduced in the preceding chapter against this opinion, it may be further remarked, that if it were well-founded, the excrescences in question ought to have for matrix and medium of union, a continuous layer of false membrane; a circumstance which is never observed; the inner membrane of the heart being found without any covering in the intervals between them. Nevertheless I am far from denying that a false membrane from inflammation may sometimes become the depository of concretions of blood. Indeed, the facts formerly mentioned, respecting the obstruction of vessels from inflammation may prove this; and I have moreover witnessed an instance of the kind in the left auricle in a case of contraction of the mitral valve. About an inch square of the auricle was here covered by a false membrane of the consistence of a firm polypus, and which was throughout deeply tinged with blood. But for the very reason that such a membrane is very perceptible when it exists, we ought to disbelieve the presence when it is not visible. I cannot help thinking that there is some analogy between the formation of these warty vegetations, on the edges of the valves and along the tendons of the pillars, and the crystallizations that take place upon threads or other minute solid bodies placed in a saline solution. At any rate, it has been already sufficiently proved, in the preceding chapter, that the blood may concrete partially, independently of all inflammation, and that the coagulum may become organized and adhere to the neighbouring parts.

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* We entirely agree with Dr. Hope in considering this opinion of Laennec, as to the origin of these excrescences, as altogether unsatisfactory; and we cannot state our reasons with more effect than in the words of Dr. Hope. On Laennec's principle, "as polypi are most common in the right cavities of the heart, vegetations ought to be so likewise,—the reverse of which is the fact. The valves, moreover, being perpetually in motion, would be the last parts to which albuminous concretions would adhere, as it is a stagnant state of the blood which is most favourable to their formation; yet the valves are the parts most subject to them. It is amid the intricacies of the columnæ carneæ, where the blood is more stagnant than elsewhere, that we most commonly find *real* albuminous concretions of small size. Finally, if vegetations were merely fibrinous concretions, instead of being rare, they ought to be frequent; for as the circumstances which, on this view, lead to their formation, are common to all persons labouring under an obstructed circulation, all, or to say the least, many, should be affected with them."—(Loc. Cit.)—*Transl.*

Corvisart has observed no particular sign characteristic of these excrescences, different from those of contraction of the orifice from other causes. In none of his cases has he ever noticed the *purring-thrill*, although considered by him as the only pathognomonic sign of such affections. I conceive that, unless the excrescences are extremely numerous, they ought very slightly to affect the motion of the valves, and, consequently, that they ought to afford no sign of their presence. Moreover, from the circumstance of these bodies being usually complicated with a severe disease of the heart or lungs, their symptoms are sometimes masked by those of the former, or the attention diverted from them. But when sufficiently numerous materially to affect the play of the valves or obstruct the orifices of the heart, they then become distinguishable by the signs which indicate ossification of the same parts; except that in the former case, the purring-thrill is less distinct, and the sound of the heart's contractions is more analogous to that of the bellows than the file. The following cases will illustrate and confirm most of the preceding statements.

CASE XLVI.—*Warty excrescences of the mitral valve and left auricle; rupture of one of the tendons of the mitral valve; hypertrophy and dilatation of the ventricles.*—A man, aged about thirty-five, came into the Necker Hospital in April 1819. He had been affected for five months with great dyspnœa and violent palpitations on making any considerable exertion, startings from sleep, and occasional spitting of blood. For a few days he had laboured under a severe diarrhœa. At the time of his admission the countenance was tranquil, with some colour, the pulse small, hard, and tolerably regular, and the respiration oppressed. The heart yielded a very dull sound, but a strong impulse on both sides. The sound was slightly audible on the back. The contraction of the auricle was almost as long as that of the ventricle, and yielded the bellows-sound. The purring-thrill was felt extremely distinct by the hand, over the cartilages of the fifth, sixth, and seventh ribs of the left side. The bellows-sound was also perceptible in a slight degree during the contraction of the right auricle, but much less so than on the left side. The action of the heart was somewhat irregular. The jugular veins were not swollen. The respiration was every where perceptible, but with a slight mucous rattle in some points.—Diagnosis: *Hypertrophy of both ventricles; contraction of the mitral valve from excrescence or cartilaginous degeneration.* This man died on the third day after admission.

Dissection thirty-two hours after death.—The pericardium contained a pint of serum, of a deep yellow colour, and intermixed with a great many opaque white flakes. The heart was double the size of the patient's fist. The right ventricle was very large, its parietes being at least four lines thick, and its columnæ very large. The tricuspid valves, and the sigmoid of the pulmonary artery, were of a deep violet-red colour. The right auricle was sound. The left ventricle was one-third larger than natural, and its walls were six lines thick, and its columnæ very thick. One of the tendons affixed to the edge of the mitral valve was ruptured about its middle. This rupture appeared to have been the consequence of progressive wasting of its middle part; and one of the other tendons of the same valve was unequally extenuated, but still unbroken. The whole floating border of the mitral valve was covered with small excrescences such as I have described, varying in size, form and consistence. Altogether they gave to the valve a thickened and fringed appearance. The sigmoid valves of the aorta, and the lining membrane of this artery, were extremely red, and exhibited in this respect a striking contrast with the inner membrane of the ventricle. The whole inner surface, and indeed the whole parietes, of the left auricle, were of the same red colour; and below the opening of the left pulmonary veins, and about two lines from the auriculo-ventricular opening, there was about an inch square coated with a congeries of excrescences similar to those on the mitral valve, and very firmly attached. The muscular substance of the heart was generally yellowish (except the left auricle) and of moderate firmness. The pleura contained about a pint of serum on each side. The lungs were sound.

CASE XLVII.* *Warty vegetations of the mitral and aortal valves; hypertrophy of the heart; pulmonary apoplexy.*—A woman between fifty and sixty years of age came into the Necker Hospital in April, 1817, affected with hæmoptysis, extreme exhaustion, emaciation, orthopnœa, and general anasarca. No account of her previous state could be obtained. The expectoration consisted partly of yellowish or chocolate coloured mucus, and partly of blood. The pulse could hardly be felt on account of the œdema, but it was ascertained to be irregular and small, yet somewhat hard. Percussion elicited no results on account of the flaccidity of the integuments; no pulsation was felt in the region of the heart: the jugulars were slightly swollen. The disease was entered as follows: *Slight pleuro-pneumonia with hypertrophy of the right ventricle.* She was bled and took diuretics, with the temporary effect of lessening the dyspnœa and anasarca. The diagnosis was afterwards modified as follows: *Hypertrophy of the left ventricle: ossification or contraction of the mitral or aortal valves? tubercles?* *

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* This case, originally published in the first edition, in the chapter on pulmonary apoplexy, was omitted in the second: it is now restored, and inserted here as an example of excrescences in the heart, and also as a good case of pulmonary apoplexy.—*Transl.*

Dissection twenty-four hours after death.—Both cavities of the chest contained about a pint of bloody serum, each with flakes of coagulable lymph. The left lung contained in different parts of its parenchyma portions of a reddish-brown colour, firm, granular when incised, exactly circumscribed, and surrounded by a perfectly crepitous tissue. These indurated masses were not at all like those of pneumonia, but seemed to be the consequence of a peculiar combination of the blood (strongly coagulated, and as if partially *dried*) with the pulmonary tissue. In the inferior lobe there was a similar mass, more than a cubic inch in extent, formed by three concentric layers, separated from each other by thinner layers of a tissue still retaining its original soft and crepitous character, but only much redder than natural. The larger layers, obviously the product of effused blood, were of a dark-red colour, granular when incised, very firm, fragile, and so dry that it was with difficulty that even a small portion of clotted blood could be expressed from them. One of these layers was so soft in one point as to resemble a clot of blood. The portions of lung thus indurated yielded, when cut into, no moisture, except when compressed or scraped; while the other parts of the lungs were more than ordinarily imbued with a yellowish frothy serum, which escaped from them when incised. There were a few tubercles. In the right lung there was one mass like that in the left; and the mucous membrane of the bronchi was of a deep red colour, in different points, in both lungs. The heart was twice the size of the subject's hand. The walls of the auricles were slightly thickened, and their lining membrane was easily separated. The left ventricle could have scarcely held an almond in its shell. The fleshy columns were separated from each other like those of the right ventricle, and at their origin the ventricular wall was an inch and a half in thickness. The edges of the mitral valve were shrivelled and slightly cartilaginous, and contained three excrescences about a line in length, firm and not readily separated by the handle of the scalpel. The right ventricle was somewhat thicker than natural, and its fleshy columns more conspicuous. The aorta was so small as hardly to admit the little finger. Two of its valves presented excrescences similar to those on the mitral, very like certain syphilitic warts.

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* The notes of this case having been in part lost, I can only give the diagnosis recorded, without the ground on which it was founded.—*Author.*

2. *Globular excrescence.*—The globular excrescences have an appearance quite different from those just described, resembling little balls or cysts, of a spherical or oval shape, and of a size from that of a pea to that of a pigeon's egg. Their exterior surface is even, smooth, and of a yellowish-white colour; and the thickness of their walls is very uniform, being never more than half a line. The substance composing these is opaque and very similar to that of old polypi, its consistence being firmer than boiled white of egg. Their inner surface is not so smooth as the exterior, and it appears to be composed of a softer substance, which occasionally has the appearance of passing gradually into the matter contained within it. This matter may exist in three different states, all of which may be found in the same subject, but in different cysts. These are, 1st, a liquid resembling half-coagulated blood, only turbid as if intermixed with some insoluble powder, and sometimes containing a few clots of perfectly coagulated blood; 2nd, a more opaque matter, of a pale violet colour, of a pultaceous consistence, and very like the lees of wine; and 3rd, a yellowish, opaque fluid, like thick pus or thin paste, and evidently consisting of decomposed fibrine like that found in aneurismal sacs.

I have only met with cysts of this kind in the ventricles and auricular sinuses. They are found as frequently in the right as the left side of the heart, generally near the apex of the ventricles, and always adherent to the walls of the cavity. They are attached by means of a pedicle, which is often so slightly connected with the columnæ carneæ as to be detached from them without being ruptured. This pedicle, although forming part of the excrescence, resembles the common polypi more than the other portions, and seems as if it were of more recent formation and less perfectly organized. I have never found these bodies more organized than I have described, and I have considered those containing clots of blood as the newest; those containing a fluid like the lees of wine as next in order, and those containing a puriform matter as the most ancient. I suspect that Crüwell's case, formerly mentioned, was an example of this kind of excrescence, completely organized and arrived at the state of cartilage or bone. I have met with these excrescences in subjects who had died of different diseases, but all of whom had remained in a dying state for several days or even weeks. Upon examining the heart with the stethoscope, in these cases, I have been able to detect no constant disorder of the circulation; and in some the action of the heart has continued regular to the last.

In the *Miscell. Nat. Cur.* we find a case of tumour of the heart which seems to have been an example of the excrescences we are now considering; and this, and the case of Crüwell, are the only ones I have met with in the older authors. The work of Burns contains three examples of this affection, in two of which "a membraneous-looking capsule encircled the polypus, which was composed of firm concentric layers, and the roots of which were interwoven among the musculi pectinati." (p. 194.) In a third case, this author met with a similar vesicle containing a teaspoonful of perfect pus. An instance of the same kind is cited from Baillie (Morb. Anatomy;) and perhaps we ought to add a fourth case by Burns (p. 202,) of a polypus attached to the left auricle, of the size of a pullet's egg, and partially ossified.

The formation of these globular excrescences is not easily accounted for. The first time I observed them I was reminded of a remarkable case which I met with during my studies, and which is recorded by M. Tonnelier in the *Journ. de Méd.* t. iv. A young woman swallowed an ounce of arsenic, and recovered. A year afterwards she did the same and died. On examining the stomach, there was found (beside the traces of the arsenic) a cyst of the size of a goose's egg which appeared to have been recently separated from the vicinity of the pylorus. In this cyst, which was precisely like the false membranes of an old pleurisy, and about a line in thickness, there was an ounce of crystallized arsenic; which must have occasioned an instantaneous inflammation, and such a secretion of coagulable lymph as sufficed to envelope it. The globular excrescences have the same form and consistence as the cyst in question; but they contain no substance sufficiently irritating to have occasioned inflammation. We have already seen, that the more recent contain only blood or concrete fibrine; and the more ancient, what seems to be pus. If pus were always contained in these vesicles, we might imagine that this might occasion inflammation; but the contrary is the case, and it seems much more probable that the pus is secreted by the containing membrane. On the other hand, the pedicle by which these bodies are attached to the pectinate muscles, is almost always less organized than the other parts, and its very extremity looks as if it were only just recently coagulated. It would therefore seem, that the formation of the vesicle were long anterior to the period of its attachment to the walls of the heart.

These globular excrescences not being as yet well known, I will here give two examples of them, in addition to one reported in a former chapter.

Case XLVIII.—*Globular excrescences in the right ventricle, in a phthisical subject.*—A woman, aged forty, came into the hospital on the 30th October 1817, affected with phthisical symptoms, which, together with occasional faintings and palpitations, had existed for a year. At the time of her admission, there was considerable emaciation, hectic fever, frequent cough with copious expectoration of opaque yellow sputa. On the 18th of November, at which time the symptoms remained nearly the same, percussion of the chest gave a pretty good sound, everywhere except in the region of the heart, where the sound was somewhat dull. The action of the heart, under the stethoscope, was not healthy, the pulsations were too frequent and often irregular— two or three regular beats being followed by others very quick and attended with a sort of convulsive bound. The sound of the ventricular systole was dull, and the impulse either feeble or so confounded with the respiratory movements as to be appreciated with difficulty. There was also distinguishable, a sound resembling that produced by a bubble of air escaping from a fluid, or like the dash of water shaken in a thin glass flask. Respiration was every where weak, but less distinct on the left than on the right side. Pectoriloquy was not perceived. There was a sense of constriction in the cardiac region and a slight pain in the back immediately opposite. Diagnosis: *Tubercles in the lungs; disease of the heart, not yet discriminated.* November 29. Dyspnœa somewhat less. The peculiar sound above mentioned, no longer perceptible. Contraction of the auricles and ventricles nearly equal, and the sound more obtuse than natural—but perceptible under the clavicles:—*hypertrophy with dilatation of the heart.* She died on the 5th December.

Dissection twenty-four hours after death. The lungs were adherent to the pleura and full of tubercles in different stages. The heart was larger than the hand of the individual. The interior of the right ventricle contained several small vesicles somewhat larger than a pea generally, and were of the size of a small cherry. Their external surface was smooth and whitish, but with a tint of red here and there: they were all pediculated and attached to the walls of the ventricles by radicles, (interwoven with the columnæ carneæ,) the extremities of which terminated in clots of blood and had all the characters of polypous concretions. The parietes of these vesicles were opaque, yellowish, of a consistence somewhat greater than that of boiled white of egg and yet somewhat friable, and nearly twice as thick as the nail. Their internal surface was not quite so smooth as the outer, and was deeply tinted with the contained matter: this varied in different vesicles, being in some half-fluid and of the colour and appearance of wine-lees, in others of a yellowish-white, puriform, and of the consistence of paste; in others, again, it was a mere clot of blood mixed with a small quantity of fibrine. The cavity of the right ventricle was a little larger than natural: its walls of the proper thickness. The other organs were sound.*

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* In the above case, every thing leads to the belief that the excrescences originated at the time the faintings and palpitations came on, that is, about a year before death. It is evident that the excrescences in the heart were the cause of death; the phthisis being in too early a stage to produce this effect.—*Author.*

CASE XLIX.—*Globular excrescences, with hypertrophy and dilatation of the heart and pulmonary apoplexy.* A man, aged forty-five, came into the Necker Hospital, in the end of August 1818, having been for several years subject to great dyspnœa on using violent exercise, and this having become permanent since about a fortnight previously to his admission. At this time, the legs were œdematous, the face pale, the pulse hardly perceptible, *decubitus* on the back, and the sleep short and suddenly interrupted. The respiration, although short, was distinct under the stethoscope, and percussion elicited a good sound except in the cardiac region. The left ventricle gave a very great impulse, and the sound was loud; the sound and impulse of the right were middling; the sound of the auricles imperceptible. In consequence, the diagnosis was given—*Hypertrophy of the heart.* Being better, he went out of the hospital in a month, but returned about six weeks afterwards, with the same symptoms and signs as before. The use of the same means (bloodletting, aperients and diuretics) again relieved him, and he was discharged after six weeks. He returned once more on the 16th January, worse than on former occasions. He could not now lie down, and if he attempted to lie on his face, he complained of a *pulsation in the throat* opposite the sternum. The anasarca was increased, and there were now cough and diarrhœa, and also pain in the præcordia. The impulse of the heart was very great. The means formerly used afforded no relief, and he remained nearly in the same state until the 3rd of February, when he was seized with fits of extreme dyspnœa, with cough &c. which were followed, on the 4th, with severe hæmoptysis. At this time the chest sounded well, but the respiration was indistinct over the lower part of the lung, and there was a *large* mucous rhonchus over nearly the whole chest. The words "*Hæmoptysical engorgement*" were now added to the diagnosis, and the patient died four days after.

Dissection sixty hours after death.—The heart was three times as large as the fist of the individual. The right ventricle was partially filled by a polypous concretion which extended into and completely filled the right auricle. This concretion was firm and fibrinous, in parts reddish, and here and there striated as if by the rudiments of small vessels. This ventricle was somewhat dilated. Near its apex there were two or three cysts of the size and nearly of the shape of beans, of a yellowish-red colour, attached between the columnæ carneæ. Their walls were strong but thin, and they contained a fluid like wine-lees. They adhered to the columnæ carneæ by means of pedicles exactly like the firmer portions of the polypus, and interlacing with the columnæ. The walls of the left ventricle were from nine to eleven lines in thickness, and remarkably solid. The mitral valve contained several very hard cartilaginous plates, but was not altered in shape. The valves of the aorta were sound; and this artery was covered, from its origin to its second curvature, with innumerable cartilaginous and bony plates, and its arch was dilated. The right lung, in its upper three-fourths, was reddened rather than impregnated with fresh blood, and was crepitous. At its base, there was a zone of two or three fingers' breadth, and including the whole thickness of the lung, of a dark-reddish colour, as solid as liver and of a granular aspect when incised: it was exactly circumscribed, and terminated abruptly in the crepitous tissue above it. There were three or four circumscribed patches of the same kind higher up in the same lung, not larger than almonds or walnuts. The left lung was much less affected; but in the posterior part of the inferior lobe, it contained two or three circumscribed masses exactly like those in the right lung.

CHAPTER XXII.

OF PERICARDITIS.

Pericarditis is inflammation of the serous membrane, which lines the fibrous sac of the pericardium, the heart and origin of the large vessels. It may be either acute or chronic.

Sect. I.—*Anatomical characters of Pericarditis.*

1. *Acute Pericarditis.*—This inflammation, like that of all membranes of the same kind, is marked by redness, more or less deep, a concrete albuminous exudation, and a sero-purulent effusion. The redness is almost always but slight in the acute disease. When it exists, it is for the most part only partially. It is most commonly punctuated, and looks as if the surface of the membrane was covered, here and there, with little specks of blood, very close to each other. I have never perceived that this redness was accompanied by any thickening of the part. In some cases, wherein, to judge by the thickness of the false membranes, the inflammation appears to have been very great, no redness whatever can be discovered on the serous membrane, on removal of the fibrinous exudation. This concrete albuminous exudation commonly invests the whole surface of the pericardium, as well on the heart and large vessels, as on the loose sac. It rarely presents the appearance of an equable membranous layer, like the false membranes of pleurisy; on the contrary, its surface is most frequently marked by a great number of rough and irregular prominences. Sometimes the knobbed appearance of this exudation is very like what would result from the sudden sepa-

ration of two pieces of slab, joined by a pretty thick layer of butter; at other times, it is more like the internal surface of the second stomach of the calf, an observation made, in one case, by M. Corvisart. In certain cases this aspect of the false membrane has given rise to a singular error, it having been mistaken for a variolus eruption in subjects who have died of the small pox. The consistence of the lymph is usually greater than that of the false membranes of pleurisy; it is also thicker, and more firmly adherent to the subjacent parts; its colour is, however, the same, being of a pale yellow analogous to that of pus.

The serum effused in inflammation of the pericardium is limpid, of a pale yellow colour, or slightly brownish. It contains few fragments of semi-concrete albumen; at least, it very rarely contains enough of these, to give it a milky and turbid character. The quantity of this effusion is usually considerable in the commencement of the disease, often as much as a pound. M. Corvisart found it, in one case, to amount to four pounds. It would seem that the quantity of effused serum diminishes quickly, as soon as the violence of the inflammation begins to subside; as we usually find the proportion of serum and of albumen nearly equal, while in pleurisy and peritonitis, the serum is commonly from twenty to fifty times greater than that of the extravasated lymph. Frequently, even, in very violent cases, we find no effusion of serum, and only a thick and highly concrete albumen filling the whole cavity of the pericardium, and uniting the heart and large vessels to the exterior or loose portion of this membrane. In this case we may suppose that the effused serum has been quickly absorbed, and the two layers of false membrane cemented together; although it is not impossible that, in some cases, the more solid exudation may be the only one. We have seen that the same thing occasionally takes place in certain partial and sub-acute inflammations of the pleura; and several observations have led me to believe, that the cartilaginous patches that sometimes are met with on the exterior of the lungs, are produced in the same manner. Sometimes pericarditis, like pleurisy, is *hæmorrhagic*, in which case the serum is sanguineous, and the surface of the false membranes is of a red colour. When the disease terminates favourably, the pseudo-membranous exudation, after a certain time, is converted into cellular substance, or rather into laminæ of the same nature as the serous membranes; that is to say, the laminæ are double, the exterior surface being exhalent, and the interior cellular or adherent, and containing the vessels distributed to the part. Sometimes these laminæ are long, sometimes so short, that the pericardium seems intimately adherent to the heart.

Sometimes, though rarely, the inflammation is confined to a part only—sometimes a very small part—of the pericardium. These partial inflammations are in proportion to the general, in point of frequency, hardly as one to ten. Their anatomical characters are precisely the same, only that the albuminous exudation is in them confined to the inflamed part. The serous effusion is sometimes as abundant as in the general disease; more commonly, however, it is less. The inflammation in this case almost always terminates in being cured, by the transformation of the pseudo-membranous exudation into long serous laminæ: scarcely ever are the partial inflammations followed by the intimate adhesion of the parts.

We often find on the surface of the heart, opaque white patches, sometimes as large as the palm of the hand, more commonly one-half or one-third this size, and often very small. They are nearly of the thickness of the nail, and have a degree of consistence equal to that of the membranes composed of condensed cellular substance,—such, for instance, as the exterior membrane of the lymphatic glands. They adhere so closely to the parts on which they lie, that it is difficult to ascertain, even by dissection, whether they are situated above or beneath the fine membrane covering the heart and great vessels. M. Corvisart is of opinion that they are beneath it. I have, however, ascertained the incorrectness of this opinion, as I have several times been able to remove the patches, leaving the serous membrane of the pericardium still untouched. Are these patches the effect of partial pericarditis, and the consequent conversion of the effused lymph into a condensed membranous cellular tissue? Analogy leads us to answer in the affirmative, since no production of this kind takes place in the system without previous exudation of coagulable lymph. M. Corvisart considers them as produced without previous inflammation, and seated, as I have already said, beneath the serous surface of the pericardium. Both these notions are, I think, inadmissible, inasmuch as there exists no example of an albuminous exudation on the adherent surface of a serous membrane, and as facts without number prove that pseudo-membranous exudations are almost always the product of inflammation. I have lately met with a case which appears to me to throw some light on the question of the origin of these spots. In a man who died of peripneumony, I found a thin false membrane, very firm, and of a yellowish colour, investing the right auricle and a portion of the ventricle of the same side, all the rest of the pericardium being quite free, only containing in its cavity two or three ounces of a transparent and slightly yellow serum. Some parts of the false membrane, particularly on the auricle, were of a whiter colour and firmer than the rest, and exhibited an appearance almost the same as the white patches above described.

2. *Chronic Pericarditis.*—Chronic pericarditis is always general, occupying the whole internal surface of the serous membrane. This is commonly much redder than in the acute disease

The redness is formed by the close approximation of minute points, which look as if applied with a pencil. Rarely the chronic disease is accompanied by a pseudo-membranous exudation; and when this exists, it is thin, soft, friable, and entirely resembling a layer of very thick pus. In every case there exists a more or less copious effusion of a turbid milky fluid, sometimes having quite a puriform character. I am led to believe that the close adhesion of the pericardium to the heart, is commonly the consequence of the absorption of this fluid, and that the adhesion by the long laminæ is the product of the acute disease. In one case I found a close and general adhesion of the pericardium to the heart and large vessels, by means of a false fibro-cartilaginous membrane, in every respect like that of the pleura: this was, probably, the consequence of a hæmorrhagic inflammation. A tuberculous eruption may sometimes be developed in the false membrane, and thereby convert the acute into the chronic disease, as frequently happens in the case of pleurisy and peritonitis. I have seen two cases of this kind; and a third is noticed in Corvisart's work (obs. vii.) as far as we can judge from the brevity of the description of it there given.

In many cases of pericarditis, especially in the chronic disease, the muscular substance of the heart has lost its colour and become whitish, as if it had been macerated for several days in water. This loss of colour is sometimes attended by a considerable degree of softening; and, at other times, the consistence is natural. Most writers have regarded this loss of colour as a mark of the inflammation of the heart itself, and most of the examples recorded of carditis are merely cases of inflammation of the pericardium, accompanied by this loss of colour. A great number of those collected by M. Corvisart are of this kind. For my own part I am disposed to doubt the correctness of the opinion that refers this loss of colour to inflammation. We can never be sure of the existence of inflammation in a muscular organ unless we find a deposition of pus among its fibres.

SECT. II.—*Signs of Pericarditis.*

Signs of Acute Pericarditis.—There are few diseases attended by more variable symptoms or of more difficult diagnosis, than this. Sometimes it appears with all the symptoms of a very violent disease of the chest, obviously calculated to carry off the patient in a few days. At other times it proves fatal without leading us, in the least, to suspect its existence. Again, we find cases marked by all the symptoms usually attributed by nosologists to this disease, and in the subjects of which, after death, we discover no traces of its existence. I have myself frequently fallen into both errors, and I have seen the same thing happen to the most skilful practitioners. On the other hand, I have sometimes known these cases detected, or rather divined, by others as well as myself. The fact, however, is, that the disease is as frequently mistaken as recognized. This is the result of my own experience, up to the present time; and to mine I may add that of many of my medical brethren, and among others M. Recamier.

Corvisart attributes the difficulty of diagnosis to the circumstance of pericarditis being almost always complicated with pleurisy, pneumonia, or some other disease of the chest, which masks its peculiar symptoms. These complications, which are very common, must, unquestionably, have this effect where they exist: I must, however, confess, that the most completely latent affections of this kind that I have met with, were in subjects whose thoracic viscera were, in other respects, quite sound, and who had died of disease of the abdomen. These facts seem to prove that inflammation of the pericardium is sometimes a local affection of little violence, and of very inconsiderable influence on the general system, or even on the circulation; while, in other cases, it is accompanied by an acute fever, and by such violent disorder of almost all the functions, as to compromise the life of the patient. M. Corvisart is likewise of opinion, that it is when the disease is very acute, that the symptoms are very obscure. Its invasion, he says, is then sudden, its progress rapid, its termination almost instantaneous. When it exists in a less violent degree, but still acute, he thinks it can be recognized by the following symptoms: viz. sense of heat in the region of the heart; great difficulty of respiration; greater colour of the left cheek than the right; pulse, at first, frequent, hard, and rarely irregular, becoming, about the third or fourth day, small, hard, contracted, and often irregular; great anxiety, slight palpitations; partial faintings; *peculiar* change of features; and (towards the fatal close of the disease) total or partial cessation of the local pain; intermitting, very irregular, almost imperceptible pulse; fits of suffocation, insupportable anxiety, and general anasarca.

These symptoms are, certainly, sometimes present in pericarditis; but each, or all of them, may be absent, and some of them are very rare. I have never observed the increased colour of the cheek, have rarely heard complaints of local heat or pain; and, in place of the progressive increase of irregularity in the pulse, (as described by M. Corvisart,) I have uniformly found this irregularity intermitting, wiry, and almost imperceptible, from the very commencement of the disease.

I must admit that the stethoscope scarcely furnishes us with any more certain signs of this disease. The following appear to me to be the most common symptoms of the inflammation of the pericardium, when not latent: the contraction of the ventricles yields a greater shock, and sometimes a more marked sound than usual, and, at intervals, feebler and shorter pulsations are perceived, which correspond with intermissions of the pulse, the smallness of which contrasts remarkably with the strength of the heart's pulsation: sometimes the pulse can scarcely be felt at all. When these symptoms come on suddenly in a person who had never been affected with disease of the heart, there is great probability of their being the consequence of this disease. It is further common for the patient to have more or less dyspnœa, great distress in the cardiac region, and extreme anxiety; and to suffer syncope on taking a few steps, or on moving suddenly in his bed. The feeling of pain, heat or weight in the region of the heart, is a much rarer symptom, yet it is sometimes met with. In some cases, the cardiac region yields the dead sound; but most frequently this sign is far from being distinct. I must repeat, however, that we must not accord too implicit confidence to these signs, even when they co-exist; for pericarditis may assuredly exist without them, and they without pericarditis. The accumulation of blood in the heart, and polypous concretions, the consequence of this, give rise to precisely the same symptoms.*

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* Laennec has here taken no notice of the *leather-creak* which he had at one time regarded as a probable sign of pericarditis. (see p. 522.) I am nevertheless, still of opinion that this phenomenon ought to be observed in every case of this disease, at least at one particular period of its progress. Two old pupils of the Necker Hospital, M. M. Collin and Devillier, are positive in having proved the existence of this sign in two cases,—the former, in a man who died of chronic pericarditis, and in whom the pulsations of the heart were accompanied for six days with this leather-creak, and which only ceased when the local symptoms indicated the supervention of a copious effusion into the pericardium;—the latter, in a man who also died of chronic pericarditis, and in whom the sound was present during the whole period of his stay in the hospital: on examination after death there was found no liquid effusion in the pericardium, but the whole surface of the sac was covered with thick false membranes, like vegetations. M. Collin, who has, I know not wherefore, assumed the honour of having first observed the leather-creak, considers it to be produced by that particular dryness which the pericardium, in common with all other serous membranes, presents at the commencement of inflammation, and ingeniously assimilates it with the sound produced by the friction of the patella on the condyles of the knee bones, in cases of chronic rheumatism without effusion. (*Diverses Méthodes d'exploration*, &c. Par. 1823.) We have had already occasion to consider (see chap. *on Pleurisy*) the value of this pretended dryness of serous membranes in a state of inflammation; and we cannot, therefore, regard M. Collin's explanation as further admissible than that the sound is clearly the result of friction. It is indeed a parallel case to the *sound of friction* observed in pleurisy, and from the two cases above quoted, it is evident that it depends, like that, on the presence of a pseudo-membranous exudation of unequal thickness, or, in other words, on the absence of the natural smoothness of the membrane.—(*M. L.*)

Since the publication of the present edition of our author's treatise, the profession in this country have been supplied, by a distinguished auscultator and pathologist, Dr. Stokes of Dublin, with two most valuable and interesting memoirs on the subject of pericarditis, (*Dublin Journ.* March and Sept. 1833,) from which it results that the original opinion of Laennec, and the actual belief of his cousin and of M. Collin, respecting the value of the *leather-creak* from friction of the pericardium, as a sign of this disease, is irrefragably confirmed. The important fact discovered by Dr. Stokes, of the occasional great similarity of this sound to that of the common *bellows-sound* from affection of the valves, reconciles his conclusions, in a most satisfactory manner, with the preceding remarks of Dr. Hope, Dr. Latham, and my own. Dr. Williams, a great authority, informs me that his recent experience leads him likewise

Before the conversion of false membranes into cellular tissue was well understood, the adhesion of the pericardium to the heart was regarded by divers authors as a cause of various and serious complaints. Lancisi and Vieussens considered it as constantly causing palpitation; Meckel, as rendering the pulse habitually small; and Senac, as productive of frequent faintings. Even M. Corvisart himself has fallen into some mistakes on this head. He admits three species of adhesions,—all of which I have just described as mere varieties or stages of the same affection. These are, 1st, a demi-concrete albuminous adhesion, which is the only one recognized by him as the consequence of pericarditis; 2nd, the very intimate or close cellular adhesion, deemed an effect of gouty or rheumatic affections; and 3rd, the extended or long cellular adhesion, the cause of which is not assigned by him. M. Corvisart is further of opinion, that no person can live, and preserve a good state of health, who is affected with a complete and close adhesion of the pericardium to the heart, or of the lungs to the pleura. I have, however, met with many cases where this condition of parts was found after death, in which no disorder of the respiration or circulation existed during life. It has only appeared to me that the contraction of the auricles has become much duller when they are adherent to the pericardium. A case adduced by M. Corvisart in support of his opinion (Op. Cit. p. 34) appears to me rather conclusive against it, inasmuch

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to admit the value of this sign in pericarditis. The following propositions are given by Dr. Stokes as containing the general results of his researches: for more complete information I refer the reader to the original memoirs:—" 1. That in cases of pericarditis with effusion of lymph, the rubbing of the two roughened surfaces causes sounds perceptible to the ear, and vibrations communicable to the hand, by which the disease can be easily and securely recognized, even when all other symptoms are absent. 2. That the more rough is the state of the serous membrane, the more distinct will these signs be. 3. That the sounds accompany the two sounds of the heart in almost all cases. 4. That they are audible generally only over the region of the heart. 5. That they present themselves with various modifications of character, but often resemble the sounds produced by extensive valvular disease. 6. That they are most distinct when the region of the heart continues with its natural sound on percussion, but that the existence of fluid does not necessarily imply their complete subsidence. 7. That they may re-appear after the absorption of fluid from the bag of the pericardium, or the new supervention of inflammation. 8. That the sounds may continue when the sensation of rubbing is no longer perceptible by the hand. 9. That they are singularly and rapidly modified by direct antiphlogistic treatment to the heart. 10. That by observing the progress and mutations of those signs, we can trace the progress of organization or obliteration of the pericardial cavity, judge of the effect of treatment, and accurately ascertain the exact state of the pericardium. 11. That, hence, it must be admitted that auscultation is of direct utility in pericarditis, and that the diagnosis no longer rests on vague signs."—Dub. Journ. vol. iv. p. 60. The facts so concisely announced in the preceding propositions are of such practical importance, that I must recommend the attentive consideration of *every one* of them to the reader. It is most gratifying to those who were the early, and by some the suspected advocates of auscultation, to find it gradually working its way to the high places of the profession, and vindicating its true philosophical character and practical value by successive improvements and discoveries, among the most valuable of which I do not hesitate to regard those of Dr. Stokes detailed in the present note.—*Transl.*

as the appearances on dissection showed sufficient lesions in other organs to account for the symptoms referred by him to the adhesions between the heart and pericardium.

I have understood that an English physician, Dr. Sanders, has announced as an infallible sign of the adhesion of the pericardium to the heart, the existence of a hollow, during each systole of the organ, in the epigastrium, immediately below the left false ribs. Kreysig attributes the same remark (vol. ii. p. 623) to Dr. Heim of Berlin. During the last two years, I have sought in vain to verify this observation among all my patients who presented any disorder of the circulation; and in none of them have I found the epigastric depression, although several had this very adhesion of the pericardium.

The signs of *chronic pericarditis* are still more uncertain than those of the acute disease. This uncertainty arises not merely from the variability of the signs, but also from the greater rarity of the disease in an essentially chronic state. I have attended several cases which I considered, throughout their whole course, as chronic inflammations of the pericardium, but which were almost all cured. In two or three cases only, have I been able to verify the correctness of my diagnosis by examination after death; whilst frequently I have found the pericardium full of pus, and in a true state of chronic inflammation, without having been at all led to suspect such an affection. In the cases which have occurred within the last few years, I have found the symptoms to be precisely the same as in the acute disease, only less violent. Percussion alone may afford some assistance, but only in the case where effusion is considerable. From one to two years has elapsed before a cure has taken place. This has been almost insensible in its progress; and when it has been effected, the action of the heart and pulse has become natural and regular.*

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* Inflammation of the pericardium is of much more frequent occurrence, both in the acute and chronic form, than is generally supposed. It is no wonder that it is so constantly mistaken or overlooked by common practitioners, after the confession of inability to detect it, made by our author in the text. It is of great importance, however, that it should be distinguished; and it need hardly be said, after the statements made in the last note, that its diagnosis is now in a very different state from that in which our author left it. Dr. Stokes's observations apply chiefly to the *dry pericarditis*; and M. Louis's memoir, which applies more particularly to that with copious liquid effusion, leaves little to be desired as to its verification. This distinguished pathologist is of opinion that the *dull sound on percussion*, when percussion is properly conducted and due regard is had to the history of the case, may alone be considered as almost an infallible sign of the disease. Our documents respecting the history of this disease are now very ample; and I earnestly recommend the careful study of them to the young practitioner. Want of space, from the already too great size of this volume, prevents me from doing more in this place than indicating some of the best sources of information, and a good deal that is not noticed by M. Laennec. The different varieties of this affection are treated of by Testa in several chapters, and also by Kreysig in different parts of his elaborately misarranged book. The most recent and best accounts are those by Bertin, (*Malad. du Cœur*, p. 39,) Andral, (Clin. Méd. t. iii. p. 415,) Louis, (Mémoires ou Recherches, p. 253,) Hope, (Dis. of the Heart, p. 84, and Cyc. of Pract. Med. vol. iv.,) Latham, (Med. Gazette, vol. iii.

CHAPTER XXIII.

OF HYDRO-PERICARDIUM.

It is extremely common to find a greater or less quantity of serum in the pericardium; most frequently this does not exceed a few ounces, and can rarely be considered as idiopathic in its origin. Most commonly it can only be regarded as taking place in articulo mortis, or immediately after death. When there exists a general dropsical diathesis, we occasionally find some

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p. 213,) Stokes, (Dub. Journ. vol. iii. p. 63; vol. iv. p. 29.) For the *Literature of Pericarditis*, see end of chap. *on Carditis*. A vast number of separate cases of this affection are scattered through the works of practical writers, and the periodical literature of this and foreign countries. Several are contained in my work on the Stethoscope.

The *treatment* of pericarditis has been entirely overlooked by our author,—an important subject, which I can merely allude to in this place. The general principle of treatment must be the same as that of pleurisy, only that the depletory measures ought to be still more active in pericarditis, as well on account of the more important character of the part affected, as because the omission of them will be productive of greater local mischief than in the case of pleurisy. Two modes of restoration are possible; the one complete, by the resolution of the inflammation and the absorption of the whole of the effused fluid; the other incomplete, by the resolution of the inflammation, the absorption of the serous portion of the effusion, and the more or less extensive agglutination of the loose to the adherent pericardium, by means of the extravasated lymph: if neither of these terminations ensues, but the pericardium remains distended with fluid, death may be said to be almost inevitable. Hence the extreme importance of prompt and active measures in the very commencement of this disease, by which, if we fail in producing the first and most desirable result, we may entertain a confident hope of effecting the second; for although adhesion of the pericardium to the heart, especially if of considerable extent, is a serious evil and almost always productive of yet greater organic disease of the organ, and eventually of death, still it is a great object to attain even this termination, in the severer cases. Immediately after the employment of copious venesection and cupping or leeching, or rather contemporaneously with the latter, the system should be brought under the influence of mercury as speedily as possible by the free administration of calomel, or of calomel and opium on the plan of Dr. Hamilton. This plan of treatment originally introduced by Dr. Farre has been more recently advocated by Dr. P. M. Latham, (see his excellent essays on diseases of the heart in the third volume of the Medical Gazette,) and enforced by the evidence of numerous facts and by the most conclusive reasoning. " From acute pericarditis which has proceeded to the deposition of lymph, nothing I believe (says Dr. L.) can ensure a perfect recovery but mercury so employed as to produce its peculiar and specific influence upon the constitution, —mercury producing salivation. I would not hazard this assertion unless I firmly believed that the fact was brought as near to demonstration as the nature of things allows." p. 215. Dr. Latham is convinced that mercury has the power of even arresting the deposition of lymph as well as of promoting its absorption, in acute inflammations in general, a fact, indeed, visibly proved in cases of iritis not of a syphilitic nature; and as he maintains that " after an inflammation of the pericardium has absolutely ceased, and the patient's life is saved for the present, if adhesion remain, death will nevertheless be its consequence in the end," the paramount importance of this mode of treatment cannot be placed in a stronger light. I will only further add, that, as it is only in the acute stage of the disease, that much benefit can be expected from this or any other measure, no means ought to be neglected of establishing a *correct diagnosis*,—the only basis on which successful practice, in this or any other disease, can be established.—*Transl.*

water in the pericardium; but, in general, it contains less than the other serous cavities. In the idiopathic hydro-pericardium, on the contrary, the pericardium is commonly the only membrane which contains serous effusion. The effused serum is sometimes colourless, ut more commonly it is yellowish, brownish or reddish, although still perfectly limpid, and without any admixture of flakes of lymph: rarely it is sanguineous. It is variable in amount. Most frequently it does not exceed one or two pounds, but it has been found in much greater quantity than this. M. Corvisart (Op. Cit. p. 53) records an instance wherein eight pounds were found. This effusion is attended by no change in the heart, or its coverings. Some authors have, indeed, stated the heart to have appeared as if macerated in such cases; but I am disposed to consider such statements as the result of imperfect observation and incorrect description.

Signs.—Authors vary respecting the symptoms of this affection. Lancisi states the principal to be, a sensation of an enormous weight in the region of the heart. Reimann and Saxonia assure us, that the patient feels his heart swimming in water. Senac says, he has *seen* the fluctuation of the fluid between the third, fourth, and fifth ribs. M. Corvisart says, he has perceived this fluctuation by the touch, and adds the following marks of the affection:—sense of weight in the region of the heart; diminished resonance on percussion; pulsation of the heart irregular and obscure, and felt over a large space, and with variable intensity, in the same and different points of this space; pulse small, frequent and irregular; threatened suffocation on lying in the horizontal posture; frequent syncope, but rarely palpitation; œdema. To these symptoms I may apply the same remarks as to those of pericarditis; they may exist, in greater or less number, and with or without hydro-pericardium. The stethoscope will, no doubt, assist us in the diagnosis; but from having had few opportunities of witnessing the idiopathic affection, I am unable to say what precise signs it will supply. When the effusion is in small quantity, (less than a pint, for instance,) I am of opinion that it will be indicated by no certain sign, but that when it exceeds two or three pints, it may sometimes be recognized by means of percussion, auscultation, and inspection of the chest.*

In this case a precise diagnosis is the less to be regretted, firstly, because the disease is so extremely rare; and, secondly, because it is so little under the controul of medicine. It may, however, be possibly removed by a surgical operation. And were this to be had recourse to, I would not recommend a puncture between the cartilages of the ribs, as advised by Senac and practised by Desault; but that the sternum should be trepanned. This operation is not, in itself, at all dangerous, and is of easy performance. By means of it we are enabled to see and touch the pericardium; and may thus verify our diagnosis, before proceeding to lay open the membrane. This is the only part of the operation attended with danger, from inflammation produced by the admission of air; and yet it might be, perhaps, advisable to excite this very state by means of slightly stimulant injections, in order to effect a cure of the disease.*

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* The experience of Louis, given in the last chapter on pericarditis, proves our author to be under a mistake as to the maximum quantity of fluid that can be detected, by means of percussion, in the pericardium.—*Transl.*

CHAPTER XXIV.

OF PNEUMO-PERICARDIUM.

By this expression I shall designate those collections of air, howsoever produced, which are met with in the pericardium. They are very often observed in the examination of dead bodies, particularly such as have been kept some time. In the latter case, the effusion is, no doubt, the effect of decomposition, but in many others the complete absence of all signs of putrescence proves it to have existed previously to death. Sometimes the air is combined with a liquid, and this is by much the most frequent case: at other times, the pericardium is distended by air alone. The effusion of air and serum into the pericardium, may occur in the agony of all diseases. I have sometimes been enabled to announce its presence, from the supervention of an increased resonance over the lower part of the sternum, and from the existence of the sound of fluctuation produced by the action of the heart and by deep inspirations.

As these observations were anterior to those made respecting the sound of the heart's action heard at a distance from the body (See Sect. III. Chap. V. of the present book,) I did not ascertain whether this last-mentioned phenomenon was present or not: but I am convinced that in almost all the cases where the sound is heard at a distance, the cause of the phenomenon is a temporary development of gas in the pericardium: this gas being, most frequently, speedily reabsorbed, and while present occasioning no serious inconvenience. A physical phenomenon of this kind must acknowledge a cause analogous to those which produce similar effects; and in reference to this particular phenomenon, I can conceive only four capable of giving rise to it: 1. that just mentioned; 2. the development of gas in the cavities of the heart themselves—a proposition altogether inadmissible, since death must instantly be the consequence of such a state; 3. the ossification of a portion of the heart's surface corresponding to the sternum or cartilages of the ribs—a condition of parts incomparably more rare than the phenomenon in question; lastly, the co-existence of such a degree of induration of the muscular substance of the heart with such violent action of it, as to render its impulse against the thoracic parietes (that is, the contact of two surfaces comparatively soft and moist) productive of a sufficient degree of resonance. This last hypothesis becomes the more improbable from this consideration, that when the heart is *indurated* it is also *hypertrophied;* and we know that the persons in whom the sound of the heart is heard at a distance, are almost always nervous subjects, with a soft muscular fibre, and a heart possessing very little real force of contraction.

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* For some curious cases of this affection, in which *tapping* was successfully performed by Dr. Romero, a Spanish physician, the reader is referred to Dr. Johnson's Review for Dec. 1820, p. 477.—*Transl.*

CHAPTER XXV.

OF ACCIDENTAL PRODUCTIONS IN THE PERICARDIUM.

Various species of accidental productions have been found between the pericardium properly so called, and the pleura; also, between it and the internal and serous membrane; and, lastly, between the serous membrane and the heart. In the Sepulchretum of Bonetus, and other collections of cases, we find examples of what appear to be tubercles, cancerous tumours, or cysts, in the different situations just mentioned. But the imperfect knowledge of membranes before the time of Bichat, and the general confusion of all accidental productions under the names of scirrhus, carcinoma, atheroma, &c. renders it impossible to ascertain precisely either the nature or site of such morbid growths. I have already noticed the fatty productions, in the form of a cock's comb, developed occasionally between the pleura and fibrous membrane of the pericardium. Twice or thrice I have found tubercles in the same situation, in subjects which exhibited a great number of these bodies in the lungs and elsewhere. I have also seen a tubercle situated at the point of the origin of the pulmonary artery and beneath the serous membrane of the pericardium.

Once only have I met with an instance of ossification between the layers of the pericardium. As this case was remarkable both for its extent and the effects produced by it, I shall here briefly detail it.

Case XLVI.—A man aged sixty-five years, had led an intemperate life, but had, nevertheless, enjoyed good health until his fiftieth year. At this time he appears to have had an attack of pleurisy of short duration, but which was followed by œdema of the lower extremities, and subsequently by anasarca of other parts, and by dyspnœa and breathlessness on ascending a height, or using any degree of exercise. When he came into the hospital, in the end of spring, the dropsical symptoms continued and the lips were swollen and blue. The pulsations of the heart were unequal, irregular, and very distinct, though perceptible over a very small extent of the chest. The pulse was feeble, small, soft, unequal, intermittent, and irregular. There was no cough, but copious expectoration. The thorax sounded well superiorly, but badly on the lower parts. The patient could lie in any posture; slept well, even without having his head raised, and had no sudden startings from sleep. He died in the course of a few months, the dropsical swellings and dyspnœa having much increased.

Dissection twenty-four hours after death.—The brain, lungs, and abdominal viscera were found in a sound state. The heart was enlarged, and adhered throughout to the pericardium, by means of very close cellular attachments. On first touching it, it seemed to be quite enclosed in a bony case, situated beneath the fibrous membrane of the pericardium; but on further examination this incrustation was found to be incomplete. Around the base of the ventricles there was a zone or band, partly bony and partly cartilaginous, of from one or two fingers' breadth, of unequal thickness, flattened, yet somewhat rough on its surface. This band projected into the angle between the ventricles and auricles, and extended along the interventricular septum on both sides, to near the apex of the heart. The whole of this production was contained between the fibrous membrane of the pericardium and the serous membrane which lines it internally. The auricles were enlarged so that each might have contained a large egg. One of the mitral valves contained an ossified point of the size and shape of a French bean.

In 1823 I met with a similar case, only that the incrustation was less extensive. Crüwell, Pasta, and Burns, seem to have observed analogous instances.*

CHAPTER XXVI.

OF ORGANIC AFFECTIONS OF THE VESSELS OF THE HEART.

The Coronary Vessels.—The most common disease of the coronary arteries is ossification. It presents precisely the same characters as the same morbid condition in other vessels. Bertin (p. 514) has found one of the arteries entirely obliterated from this cause. In the case of simple dilatation of the heart, or of dilatation with hypertrophy, we very frequently find the coronary arteries dilated through their whole extent. In an example of hypertrophy of the left ventricle, Bertin found the left coronary artery of double the diameter of the right. The only morbid change of the coronary veins that I have met with is their general dilatation. In rare instances they present, like the varicose veins of the extremities, some points much more distended than others. The circumstance that strikes us most, at first sight, in this case, is the prolongation of the natural flexions of the vessels, their length as well as diameter being increased. This appearance is particularly observable in subjects who have long laboured under dilatation or hypertrophy of the heart. The ossification of the coronary arteries has been regarded by Heberden and Parry as the cause of *angina pectoris;* and this opinion has been adopted by almost all the English and German physicians: I shall investigate its correctness when treating of the disease in question.

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* See also Baillie's Morb. Anat. p. 13.—*Transl.*

The Pulmonary Artery.—The affections of the pulmonary artery are few in number. Those which have been hitherto observed are only the dilatation and bony incrustation of this vessel. Of this latter affection there are not more than three or four cases on record, if we except those in which there existed a preternatural communication between the right and left cavities of the heart.* It is by no means very rare to find the pulmonary artery dilated beyond the usual size. I have found its diameter greater than that of the aorta; and sometimes I have observed it sufficiently wide at its origin to admit three fingers. Morgagni relates several instances of this affection, (Epist. 23, 24, 25. 27.) Most of the cases of dilatation observed by myself occurred in chronic affections of the lungs. Ambrose Paré informs us that he found the *arteria venosa* (which I presume, with Morgagni, to mean the pulmonary artery) so much dilated as to admit the hand, and ossified on its internal surface. A case is recorded in the *Ephem. Cur. Nat.* (Dec. iii. ann. vi. obs. 207) which would seem to prove the possibility of aneurism taking place in the pulmonary artery. "Arteria pulmonalis tam copioso sanguine turgescebat, ut, quasi aneurismate affecta, præter propriam magnitudinem præternaturalem, hinc inde sacculos cruore coagulato turgidos habuerit appensos."

I have never witnessed any symptom which could be referred to the dilatation of the pulmonary artery. And, indeed, the affection is almost always combined with some more serious dis-case of the lungs or heart. A similar conclusion may be drawn from the cases noticed by Morgagni.

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* For two singular cases of *contraction* of the pulmonary artery, see the *Medical Gazette*, vol. ii. p. 220, July, 1828.—*Transl.*

The Pulmonary Veins.—Sometimes we find the pulmonary veins dilated in a greater or less degree; but only in the case of organic disease of the heart, particularly of the left cavities. In the case of a young woman who died suddenly, after having exhibited all the symptoms of diseased heart, Chaussier (Mém. de l'Acad. 1748) found the pulmonary veins dilated (as were also the left ventricle and auricle) and one of them ruptured just as it leaves the lungs. The original cause of all this mischief was ossification of the sigmoid valves of the aorta.

CHAPTER XXVII.

OF THE ORGANIC DISEASES OF THE AORTA.

I FORMERLY took notice of inflammation of the inner membrane of the aorta, and of the small suppurating pustules which sometimes form in its coats and open on its internal surface. I have also mentioned the bony incrustations that occur in it; but these as well as some of its other affections merit further detail in this place.

SECT. I.—*Bony, Cartilaginous, and Calcareous Incrustations of the Aorta.*

These formations belong to the class of imperfect ossifications. They are of an irregularly flattened form; and when they are of unequal thickness they project rather towards the outside than the inside of the vessel. They are situated between the internal and middle coat, and being as it were encased in this latter, they sometimes retain the impression of its circular fibres on their outer surface. Their inner surface is sometimes smooth, and evidently covered by the internal coat of the vessel; in other cases, it is rough, and seems to have partially destroyed this tunic by its asperities. In examining cases of this kind minutely, we can perceive many different points of ossification, which extending themselves in their superficial diameter, reunite and form incrustations of a larger size. In some instances these involve nearly the whole circumference of the vessel, and thus form a fourth tunic of a bony character. The cartilaginous incrustations are the rudiments of the bony; their situation and mode of growth are the same. They are much softer than natural cartilages, and are transformed into bone without even acquiring this degree of consistence. In becoming ossified, small specks of calcareous phosphate are first deposited, and these by their gradual extension and union finally convert the whole into a homogeneous mass. Sometimes these incrustations seem to be produced without any previous formation of cartilage, being deposited in the form of an impalpable and very humid powder between the inner and middle coats; and we frequently find a layer of this sort beneath the cartilaginous plates.

These bony incrustations are found frequently loose at their circumference, in consequence of rupture of the internal coat of the artery. This separation (which seems to be one of the most common causes of false aneurisms) leaves a little cavity, which becomes filled with lymph, sometimes intermixed with phosphate of lime. This matter has been denominated *atheromatous*, and the parts containing it *ulcers*, by many observers. And, indeed, it is probable that in extensive separations of long standing, the parts in question may assume an ulcerated character. Very frequently, however, these characters do not exist; in every case, the affection in the first instance, is the consequence of the mechanical separation of the scale as formerly mentioned; and if inflammation even occurs, it is the effect and not the cause of the solution of continuity. We can at any time produce similar exfoliations by pressing gently between the fingers, an aorta containing similar incrustations. And yet these very lesions are the only grounds on which many authors build their opinion of ossification of the arteries being the result of the inflammation of these. Kreysig imagines that these scales are produced by the gouty inflammation alone. Others, and particularly Bouillaud, consider them as the consequence of common inflammation, an opinion which was formerly the general one regarding all accidental productions. It must, however, be admitted, that these bodies are almost always formed without any general or local symptom of their existence, and indeed very frequently in persons who enjoy the most perfect health.

Tuberculous and cancerous productions of the aorta are very rare: I have met with some of a small size, however, in the cellular coat.

SECT. II.—*Malformation of the Aorta.*

I have already noticed the congenital smallness of the aorta, considered by Corvisart as one of the most frequent causes of aneurism of the heart. I have seen cases of this kind in which the diameter of the vessel was hardly eight lines. This contracted state is commonly equal throughout, or, at least, varies only according to the natural size of the vessel in different parts. In three or four cases, however, I have observed a singular deviation from this rule. In these, the aorta immediately below its arch became suddenly contracted to the size of the finger, and gradually diminishing from this point, it retained only the size of a swan's or even a goose's quill by the time it had given off the cœliac artery. In these cases the arch of the aorta was dilated, and there existed hypertrophy of the heart. In some few cases the aorta has been found completely obliterated. A case of this kind is related in the *Journ. de Méd.* t. xxxiii. *bull.* 4; another by Dr. Graham, in the Medico-Chirurgical Transactions; and a third by Mr. John Bell. Sir A. Cooper, in the same work, notices a partial deformity of the same kind; and one was lately observed by myself, in which there existed a depression, of the size of an almond, at the point of junction of the ductus arteriosus.

SECT. III.—*Aneurism of the Aorta.**

Anatomical characters.—In the following observations I shall adhere to the ancient distinction of *true* and *false* aneurisms,—the former comprehending dilatation without rupture of any of the arterial coats, the latter dilatation with rupture of some of the coats. True aneurism of the ascending portion and arch of the aorta is very common. The dilatation usually extends from the origin of the artery to the point where it begins to descend. This dilatation rarely proceeds so far as to produce very serious symptoms, the extreme point of dilatation of the artery not being wider than from two to three fingers' breadth. The convexity of the arch and anterior part of the artery appear to yield more than the other parts of the vessel. When the dilatation exists in the descending aorta, it assumes the form of an ovoid tumour, gradually terminating, at each extremity, in the undilated artery. It is not uncommon to find several dilatations of this kind in the same artery. Sometimes we find the whole tract of the aorta dilated to double its natural size. Dilatation in the arch of the aorta, in the degree above described, is very common; but this is not usually named *aneurism*, unless it arrives at a considerably greater extent. These aneurisms are sometimes very large. M. Corvisart records one double the size of the heart, and I have seen them as large as the head of a full-grown fœtus. When the *true aneurism* acquires a certain size, the inner coat is often ruptured, and *false* aneurism ensues. The true aneurism is commonly accompanied with a morbid degeneration of the internal tunic of the artery. It exhibits spots of a bright red, slight cracks, and a great number of small ossified points. These latter are usually considered as existing in the substance of the inner coat, but they are, in truth, situated between it and the middle coat. The false aneurism of the aorta, consequent to the true, is rarer than the simple dilatation of that artery; but it is much more common than that greater degree of simple dilatation which alone usually claims the name of *aneurism*. The false aneurism is most common in the ascending, and the true in the descending aorta. I have never met with any other species of false aneurism in the ascending aorta or its arch, but that consequent to the true, or simple dilatation of the part. In the descending aorta, however, false aneurism often takes place without any previous dilatation. The opinion at present current in the Parisian schools, viz. that in aneurism the internal coat remains entire, and protrudes, in the form of a hernia, through the ruptured fibrinous tunic, is more untenable, as a general position, than that of Scarpa, who maintains the rupture of the two internal tunics in every case of the disease. Both these opinions are true in certain cases, but not in all.

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* This section is considerably abridged, because it is presumed most English readers already possess superior information on the subject of it, in the classical works of Scarpa and Hodgson. See "A Treatise on the Anatomy, Physiology, &c. of Aneurism," by Ant. Scarpa, translated by J. H. Wishart, and "A Treatise on the Diseases of the Arteries and Veins," by J. Hodgson, Lond. 1815. See also Burns, Op. Cit. p. 203, and Freer's work on Aneurism, *Birmingham*, 1797. To these works I may now add the very valuable work of Dr. Hope on the diseases of the heart and great vessels.—*Transl.*

Aneurisms of the aorta produce various effects on the adjacent organs, according to their volume and position. Simple dilatation, when in a moderate degree, hardly produces any effect, but the most inconsiderable false aneurisms may give rise to very serious disorder. The first and most common of these effects is compression of the heart and lungs. When the aneurism is in contact with the lungs, it most commonly merely compresses them; sometimes, however, the substance of these organs gives way, and the aneurism, when it bursts, pours its blood directly into the air-cells. Frequently the aneurism compresses the trachea, or one of the two bronchial trunks, flattens, and eventually destroys a part of them, and death ensues by a species of hæmoptysis from the rupture of the tumour. The same thing occasionally happens with the œsophagus, but not so frequently. I have only met with three instances of death from this cause. The ordinary effect of these aneurisms on the heart, is to displace it more or less, downwards or to one side. Sometimes the aneurism bursts into the pericardium; (See Morgagni and Scarpa;) but I have never met with an example of this. A case is on record of an aneurism of this kind bursting into the pulmonary artery.* The left cavity of the pleura is, by far, the most frequent situation for the rupture of these aneurisms. I have met with one case where the aneurism compressed and destroyed the thoracic duct; and M. Corvisart notices a fatal case of compression of the superior vena cava from the same cause. The most remarkable local effects of aneurisms of the aorta, are those on the vertebral column. They often destroy this to a very great depth. This destruction is entirely the work of interstitial absorption, there never being any mark of caries. On the side next the vertebræ the sac is completely destroyed, and the circulating blood is bounded by the naked bone. Aneurisms of the ascending aorta destroy, in like manner, the sternum by their pressure, so that they come at length to be covered merely by the skin. I have met with two or three tumours of this sort so large that they could not be completely covered by both hands. The aneurisms of the arch of the aorta, and of the arteria innominata, sometimes project, in like manner, at the top of the sternum or above it, or under the cartilages of the first false ribs of the right side. It is not always the largest aneurisms that most readily make their way externally. Sometimes those of the size of an egg produce this effect, whilst, occasionally, those of the size of the head of a full-grown fœtus remain quite covered, and are even compressed by the sternum.

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* Bulletin de la Faculté de Méd. 1819.

Signs. There are few diseases so insidious as this. It cannot certainly be known till it shows itself externally. It can hardly be suspected, even when it compresses some important organ and greatly deranges its functions. When it produces neither of these effects, the first indication of its existence is often the death of the individual as instantaneously as if by a pistol-bullet. I have known persons cut off in this manner, who were believed to be in the most perfect health, and who had not complained of the slightest indisposition. We must, therefore, admit that aneurism of the aorta has no symptoms peculiar to it; all those noticed by authors, and especially by M. Corvisart, being indicative merely of the change or compression of adjoining organs. This will be evident by the enumeration of the principal of these; viz. oppression on the chest,—dissimilarity of the pulse in both arms,—a whizzing or rushing at the top of the sternum, perceptible by the hand,—obscure sound on percussion,—rattling in the throat, and dragging downwards of the larynx, when the tumour compresses the trachea, &c. After what has been said of the symptoms of other diseases of the chest, I need not remark how very equivocal all these are. In the present state of our knowledge there assuredly exists no certain means of ascertaining the existence of this disease until it shows itself externally. Even when the aneurismal tumour has made its way through the parietes of the chest, it is not always distinguishable from tumours of a different kind.

Percussion will certainly, in some cases, enable us to detect a tumour of a large size, existing within the mediastinum, or even in the back; but not to discriminate the nature of the swelling. Hitherto, my experience has been insufficient to enable me to say how far the difficulty of diagnosis is likely to be removed by the use of the stethoscope. Since my employment of this instrument

I have met with about thirty cases of what I conceived to be aneurisms of the aorta. Most of these left the hospital after obtaining relief by blood-letting and proper diet. In some instances of moderate dilatation of the arch, I was enabled to verify by dissection my previous diagnosis afforded by the stethoscope; and in two which showed themselves externally, I have had an opportunity of testing still further the stethoscopic signs. In the last cases I found the pulsations of the tumour perfectly isochronous with the pulse at the wrist; they gave, at the same time, a much greater impulse and louder sound than the mere contraction of the ventricles; and the contraction of the auricles was not at all perceptible. This pulsation, which I shall call *simple*, in opposition to that of the heart, which is *double*, (including the alternate contraction of auricles and ventricles,) was distinctly perceptible between the right scapula and the spine. —the purring-thrill and bellows-sound frequently exist in aneurisms of the aorta and other arteries; but it will be understood from previous remarks on these phenomena, that they cannot be any *signs* of this disease. In some cases, the *simple* pulsation and greater impulse may indicate the disease, but even this sign will be often wanting. In fact, in the case of enlargement of the heart, even in a slight degree, the contractions of its cavities will be audible over the whole sternum, and under the clavicles; and as the contraction of the ventricles is isochronous with the pulsation of the aneurism, these will necessarily be confounded together; on the other hand, the contraction of the auricles being heard through the tumour, we shall thus have two sounds answering to those of the heart, and which will be mistaken for them.

Another sign, however, still remains, and although less marked than the *simple* pulsation above mentioned, is, at least, as satisfactory; it is this: if we find under the sternum or below the right clavicle, the impulse of the circulatory organ isochronous with the pulse, and perceptibly greater than that of the ventricles examined in the region of the heart, we have reason to suspect dilatation of the ascending aorta, or arch,—the more so, as it is extremely rare to feel the impulse of the organ of circulation beyond the region of the heart, even in cases of the most marked hypertrophy. If this phenomenon is found constant, after repeated examinations, we may consider the diagnosis as certain.

Aneurisms of the descending aorta, particularly those which destroy the spinal column, may sometimes be recognized by means of *simple* pulsations opposite the tumour. Aneurisms of the abdominal aorta are recognized with the utmost facility by means of the stethoscope. In this case we are sensible of tremendous pulsations, which painfully affect the ear, and the intensity of which is not at all recognized by the hand, even when they are sufficiently perceptible to the touch. These pulsations are *simple;* and even when the tumour is as high up as the origin of the cœliac artery, the contractions of the auricles are not at all perceptible. The sound which attends the pulsations of the tumour, is commonly clear and loud, like that of the auricles, but louder.[*]

Of all the severer organic lesions of the thoracic organs, three only remain without pathognomonic signs to those who are versed in the practice of percussion and auscultation. These are—aneurism of the aorta,—pericarditis—and polypi of the heart;—all of which, it may be remarked, are very liable to be confounded together. I will here detail a remarkable mistake of this kind. In 1819 I was consulted in the case of a young woman, who had exhibited for eight months the general symptoms of diseased heart. I found the action of this organ regular, and accompanied by a natural degree of impulse and sound. The right and left precordial regions sounded well on percussion; but immediately above these, the sternum as high up as the second rib, and the whole surface of the chest corresponding with the cartilages of the second, third, fourth and fifth ribs on the left side, yielded a completely dead sound. Over the same space, the pulsations of the heart were much louder than in the cardiac regions, and were not *simple*. Notwithstanding this last circumstance, I imagined that there existed an enormous aneurism of the ascending aorta. I did not see the patient again; and she died a few months after my examination. Upon dissection, the aorta was found perfectly sound. The tumour which had destroyed the natural resonance of the chest, was the pericardium, enormously distended by sero-purulent fluid, and which extended to the top of the chest. The heart was invested by false membranes of a yellowish colour, somewhat friable, and hardly more consistent than thick pus, and was separated from the pericardium only by a very small quantity of serum. This pericarditis had never presented the character of an acute disease; and the treatment of Valsalva, persevered in for several months, in the intention of combating the supposed aneurism, had no effect in retarding its progress.

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[*] Bertin considers our author as undervaluing the powers of the stethoscope, in detecting aneurisms of the aorta. He says his own experience, in this particular, obliges him—"to take the part of auscultation against its very discoverer;"—and adds, that by means of it "the diagnosis of aneurisms of the aorta is not more difficult than that of diseases of the heart or lungs."—Op. Cit. p. 143. In two of M. Bertin's cases (obs. 37, 38) he formed a correct diagnosis of the disease in its earlier stages, that is, before it had shown itself externally.

My brother-annotator, Dr. M. Laennec, agrees with Bertin and Bouillaud in thinking aneurism of the aorta more easily detected than our author is willing to allow. Indeed he goes so far as to say, that "it is so uncommon that there is not perceptible in these cases (at least when the aneurism has reached a certain size) either a dull sound or *single* pulsation, or both conjoined, that it must be for want of looking for them that they are not found." Dr. Hope is equally confident of the powers of auscultation to detect aneurisms of the aorta: and we particularly recommend to the reader's attention his observations on this subject in his *Treatise of Diseases of the Heart*, and in his excellent article on *Aneurism of the Aorta* in the first volume of the *Cyclopædia of Pract. Med.* "It is unimportant" says Dr. Hope, "whether the pulsations be '*single*' or '*double*;' for though double, they may be distinguished from the beating of the heart by unequivocal criteria." I can only find room for a brief notice of these criteria, and of some of the principal signs, which I shall give in the author's own words:—1. The first *aneurismal* sound, coinciding with the pulse, is invariably louder than the healthy ventricular sound, and generally louder than the most considerable bellows-murmur of the ventricles. 2. On exploring the aneurismal sound from its source towards the region of the heart, it is found progressively to decrease, until it either becomes totally inaudible or is lost in the predominance of the ventricular sound. Now if the sound emanated from the heart alone, instead of decreasing it would increase on approximating towards the precordial region. 3. The second sound actually does sustain this progressive augmentation on advancing towards the heart; and as its nature and rythm are found to be precisely similar to those of the ventricular diastole heard in the precordial region, it is distinctly identified as the diastolic sound. The second sound, therefore, corroborates rather than invalidates the evidence of aneurism afforded by the first; for if both sounds proceeded from the heart, both would, on approximating towards it or on receding from it, sustain the same progressive changes of intensity. 4. Another distinctive characteristic of the aneurismal pulsation is the peculiar nature of its sound. It is a deep hoarse tone, of short duration, with an abrupt commencement and termination, and generally louder than the most considerable bellows-murmur of the heart. It accurately resembles the rasping of a sounding board heard from a distance; whereas the sound occasioned by valvular disease of the heart has more analogy to the bellows-murmur, being somewhat soft and prolonged, with a gradual swell and fall. When the dilatation is confined to the ascending aorta, the sound, impulse, and purring tremor, are stronger on the right than on the left side of the neck; and the sound along the sternum is superficial and of a whizzing or hissing character. The loudest aneurismal sound is that occasioned by dilatation, and it has more of the grating or rasping character in proportion as the interior of the vessel is more overspread with hard and especially osseous asperities. Old aneurisms, the parietes of which are thickened by fibrinous depositions, yield only a dull and remote sound. In all cases of dilatation and in the majority of sacculated aneurisms, the sound is loudest above the clavicles, even though the impulse be stronger below. The sound is in most instances audible on the back; and when the tumour occupies the descending aorta and is extended along the spine, it is often louder behind than on the breast. If it possesses in the back the abrupt rasping character, the evidence which it affords is almost positive; for the loudest sounds of the heart, when heard on the back, are so softened and subdued by distance as totally to lose their harshness.—Cyc. of Pract. Med. vol. i. p. 112.—*Transl.*

CHAPTER XXVIII.

OF THE TREATMENT OF THE ORGANIC DISEASES OF THE HEART.

The frequent co-existence, in the same subject, of several of the organic affections of the heart, and the absolute incurability of the greater number of them, have induced me to bring under one head, in the present chapter, all that I have to say relative to their treatment.

Of all these organic lesions, hypertrophy, either simple or combined with dilatation, appears to me most susceptible of cure. The greater number of practitioners are too much in the habit of despairing of success in cases of this kind, and, therefore, content themselves with attacking such urgent symptoms as may arise in their progress. And yet, I believe, there is no one who has not succeeded, every now and then, even by this symptomatising treatment, in prolonging for fifteen or twenty years, the lives of individuals affected with organic disease of this important organ. In courageously and perseveringly applying to the treatment of hypertrophy, the method recommended by Valsalva and Albertini against aneurism of the arteries, we may look for much more frequent and complete success; more especially if we begin the use of these means at a period when the disease has not as yet produced any severe disorder of the general system. But to obtain success in this way, it is necessary that the physician and patient should be armed with great and almost equal courage: for it is hardly more difficult for the latter to support continued starvation and repeated bleedings, than it is for the former to hold out against the daily opposition of friends and relations, and the discouragement which cannot fail to affect the patient in the course of a treatment, which must, at the least, continue for some months, and which it is sometimes necessary to persevere in for several successive years.

This plan must be carried into effect with activity, especially at the beginning; and there is much more fear that, in our endeavours to reduce the patient, we should stop short of the mark, than that we should go beyond it. Accordingly, we begin the treatment by as large a bloodletting as the patient can bear without fainting, and repeat this every second, fourth, or eighth day, at most, until the palpitations have ceased, and the heart only yields a moderate impulse under the stethoscope. At the same time we diminish, by one half, the ordinary quantity of food used by the patient; and we even make still greater reduction, if he retains more muscular strength than is barely sufficient to enable him to take a few minutes' walk in the garden. In the case of an adult in full strength, I usually reduce the quantity of food to fourteen ounces per day, in which allowance only two ounces of white meat are permitted. If the patient prefers broth or milk, I reckon four ounces of these liquids for one of meat. Wine is entirely forbidden.* When the patient has been two months without experiencing palpitations and without increased impulse of the heart, we may lessen the frequency of the bleedings, and diminish, in some degree, the severity of the regimen, if the patient is not at all habituated to or satisfied with his allowance. But we must return to the same means, and with the same vigour, if the augmented impulse of the heart should return. We ought not to have any confidence in the cure, until all the symptoms, and particularly all the physical signs of hypertrophy, have been completely absent for a whole year. We must take care not to be deceived by the complete calm which the bloodletting and abstinence sometimes induce very speedily, especially if the disease had so far advanced, before we began our treatment, as to have induced extreme dyspnœa, anasarca, and other symptoms threatening a fatal issue at no distant date. In cases of this kind, even when anasarca, ascites, œdema of the lungs and a general cachectic state of the system are present, we must nevertheless fearlessly prosecute the plan of bleeding and starvation.[*] Indeed, it is certain that, under such circumstances, diuretics never act so well as after venesection. We must have recourse, in their turn, to all the more powerful diuretics, and in rather large doses. Medicines of this class are very uncertain in their effects; and when we do not find one to answer, we must try another. Accordingly, we may give a trial, in succession, to nitre, acetate of potass, squills, various plants of diuretic properties, and among others, digitalis. This last medicine is at

present much used in diseases of the heart, from a general opinion that, besides its diuretic effects, it possesses a sedative influence over the heart. I must confess that this influence has never appeared very clear to me, certainly not constant, even when the dose was carried to the extent of producing vomiting and vertigo. I have only remarked, with some others, that in the first days of its administration, it frequently accelerates the pulsations of the heart, and seems subsequently, in some cases, to render them slower: but I can by no means consider it as a powerful remedy in hypertrophy of this organ. I may give a like report of hydrocyanic acid and the cherry-laurel water. It cannot be denied that hydrocyanic acid possesses a very considerable action on the spinal marrow, and through it on the heart; but its very activity prevents our employing it in a concentrated state; and when diluted it is very uncertain in its action.*

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* Our author only mentions *wine* among the forbidden liquors, but he of course means to exclude equally every other fermented and spirituous liquor.—*Transl.*

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[*] For the original account of this macerating treatment the reader is referred to the memoir of Albertini in the first volume of the *Commentarii de Soc. Bononiens. Scient. et Art.* 1748, entitled "Animadversiones super quibusdam difficilis respirationis vitiis a læsa cordis et præcordiorum structura pendentibus." I shall here extract a single sentence: "Et ideo nos et amicissimus vir studiorum nostrorum socius dum viveret, A.M. Valsalva, cum in cadaveribus offenderemus hæc vitia sæpius quam augurabamur, cepimus inter nos, expensa læsionis organicæ natura, existimare consentaneum pro illius curatione tutum, efficax, quinetiam fortasse unicum auxilium futurum, si ægrotans non deploratus, quadraginta circiter dies in lecto decumbens, præmissa una vel altera venæ sectione præscriptisque clysteriis, et vini abstinentia, tantum cibi et potus ad trutinam dimensi quotidie assumeret, quantum vitæ sustinendæ satis esset; illudque non bipartito tantum indies distributum, sed tripartito, et quadripartito etiam, sic ut exigua dosi sanguifera vasa ingressum, ea tum ne minimum quidem distenderet." Valsalva having been the first who put this method into actual practice, it is usually called by his name. For further accounts of it I refer to Morgagni (Epist. XVII. 30,) who, as well as Lancisi, Guattani, Sabatier, Pelletan, Corvisart, Hodgson, Bertin, &c. recommend its employment, and adduce many facts illustrating its utility. I have made trial of it in a modified degree, in hypertrophy of the heart, and, as I thought, with much temporary benefit; but I have found very few of my patients possessed of sufficient courage or faith to submit to it, even in a modified degree, for any considerable length of time. The principle of this practice, simple as it is, would seem to be strangely misunderstood by some practitioners. Some time since a patient affected with hypertrophy came to me here for advice: he had been recently under the care of a physician in London, who had him largely bled at every visit, but did not restrict him in any respect as to his diet or bodily exercise!

Some practical physicians, however, are led by experience to regard the macerating practice of Albertini and Laennec as positively injurious, even in the cases wherein it has been most strenuously recommended. See, for instance, an observation of Dr. Stokes to this effect in an excellent memoir by him on the subject of aneurism, in the 15th No. of the Dublin Medical Journ. Dr. Charles Williams likewise informs me that he has repeatedly observed many diseases of the heart and large vessels to be aggravated, and their progress hastened, by the system of starvation. "I have now," he says, "several patients with valvular disease, who are at this time tolerably comfortable with a dry nutritious diet and a moderate but regular action on the bowels; whereas, some time since, under the starving system, the circulation lost its balance, *the irritation of inanition* was added to the distress from the organic disease, and their life was a continued scene of misery." These observations, to the correctness of which my own more recent experience induces me willingly to assent, although I cannot adduce any very positive evidence in corroboration, are deserving the greatest attention; and, from the eminence of the observers, they will, no doubt, command this.—*Transl.*

When diuretics give no relief in dropsical affections, the consequence of diseased heart, purgatives are frequently found useful: and we ought to have the less scruple in having recourse to them, since their frequent repetition is sometimes as effectual as blood-letting, in reducing the action of the heart. On this account, even where there exists no signs of dropsy, if the first bleedings are ineffectual, one or two purgatives will often render the subsequent one more so. All sorts of purgatives may be useful in the serous diathesis produced by disease of the heart, but the more potent drastics, which act in a small compass, are in general to be preferred. In this case, likewise, physicians are accustomed to despair too soon of their patients, and sometimes abandon them to certain death when they might preserve their life, and even render it supportable, for several more years. Corvisart, who was by no means a timid practitioner, committed an error of this kind in the case of one of his friends. This gentleman had been for several years affected with disease of the heart, and for some time had laboured under ascites and general

anasarca, for the removal of which, bloodletting, diuretics, and some purgatives, had been unsuccessfully employed. Corvisart considered his death as certain, and made the patient's friends acquainted with his opinion. A few days afterwards a quack was consulted, famous at that time for his cures of dropsy. He administered to the patient a powerfully drastic powder in two ounces of brandy, with the immediate effect of producing twenty alvine evacuations. From this time the urine became somewhat more copious; and the same remedy being repeated with similar effect, every day for upwards of a week, the dropsical symptoms completely disappeared, and the patient afterwards lived ten years in a very tolerable state of health. When we have once succeeded, by means of purgatives, in augmenting the flow of urine, it is not always requisite to continue them for a long period; as very often the stimulus conveyed to the absorbents by two or three doses, will last more than a fortnight.*

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* French practioners, although in general so fond of new remedies of the poisonous class, and the first to employ the hydrocyanic acid, seem now much afraid of this remedy. Dr. M. Laennec, in his note on this passage, says, that so many fatal results have of late years been experienced from its use, that no prudent practitioner now gives it in diseases of the heart. I have myself found the hydrocyanic acid altogether inefficient in organic diseases of the heart. From its undoubted efficacy, however, in relieving certain states of disordered stomach, it is occasionally found a valuable remedy in those sympathetic affections of the heart depending on this cause; and it has even been proposed as a sort of diagnostic test, in doubtful cases, as to whether the disturbance of the circulation is primary or secondary. See Dr. Elliotson's "Cases illustrative of the efficacy of Hydrocyanic Acid in Affections of the Stomach. *Lond.* 1820."—See also Dr. Johnson's Review for May, 1821, p. 658.—M. Broussais has recently recommended a new sedative remedy in diseases of the heart, viz. the syrup of the common asparagus; (*Annales de la Méd. Physiol.* Juill. 1829;) a medicine which, according to him, possesses the power of quieting the action of the heart and rendering the pulse slower, without at all irritating the stomach. The plant eaten in the usual manner is said to have the same effect. This statement of M. Broussais, in reference to the asparagus as a remedy of power *generally*, in affections of the heart, requires confirmation.—*Transl.*

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present much used in diseases of the heart, from a general opinion that, besides its diuretic effects, it possesses a sedative influence over the heart. I must confess that this influence has never appeared very clear to me, certainly not constant, even when the dose was carried to the extent of producing vomiting and vertigo. I have only remarked, with some others, that in the first days of its administration, it frequently accelerates the pulsations of the heart, and seems subsequently, in some cases, to render them slower: but I can by no means consider it as a powerful remedy in hypertrophy of this organ. I may give a like report of hydrocyanic acid and the cherry-laurel water. It cannot be denied that hydrocyanic acid possesses a very considerable action on the spinal marrow, and through it on the heart; but its very activity prevents our employing it in a concentrated state; and when diluted it is very uncertain in its action.*

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When diuretics give no relief in dropsical affections, the consequence of diseased heart, purgatives are frequently found useful; and we ought to have the less scruple in having recourse to them, since their frequent repetition is sometimes as effectual as blood-letting, in reducing the action of the heart. On this account, even where there exists no signs of dropsy, if the first bleedings are ineffectual, one or two purgatives will often render the subsequent one more so. All sorts of purgatives may be useful in the serous diathesis produced by disease of the heart, but the more potent drastics, which act in a small compass, are in general to be preferred. In this case, likewise, physicians are accustomed to despair too soon of their patients, and sometimes abandon them to certain death when they might preserve their life, and even render it supportable, for several more years. Corvisart, who was by no means a timid practitioner, committed an error of this kind in the case of one of his friends. This gentleman had been for several years affected with disease of the heart, and for some time had laboured under ascites and general

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A nun, fifty years of age, had been affected for twelve years with all the symptoms of disease of the heart, in a very high degree, viz. strong and frequent palpitations, habitual dyspnœa, breathlessness on using the least exercise, sudden startings from sleep, almost constant œdema of the lower extremities, and lividity of the cheek, nose and lips. These symptoms had increased during the last year, so that she could scarcely move from her chair without the feeling of suffocation. In this state I recommended the treatment of Valsalva, which she agreed to. I immediately reduced her food to one-fourth of her former allowance, and bled her once a fortnight, either from the arm or by leeches. This mode of treatment gave immediate relief, and in the course of six months all the symptoms had disappeared; and, with the exception of debility, (which, however, was not greater than it had been previously,) she enjoyed a better state of health than for many years before. The respiration was now free, and the palpitations, œdema, startings, and lividity of face had quite disappeared. After this I recommended the bleedings to be decreased in frequency, and I dispensed with them altogether at the end of a year. She also returned gradually to her old regimen, only that now a much smaller quantity of food satisfied her appetite. She lived two years in a state of perfect health, and was then suddenly carried off by an epidemic cholera. Upon examining the body after death, I found the heart considerably less than the closed hand of the individual, being only about the usual size of that of a child twelve years old, although this woman was five feet three inches in height. The exterior of the heart resembled, in appearance, a withered apple, the wrinkles running longitudinally. The ventricular parietes were flaccid, but without any obvious softening, and of the natural thickness. I am well aware that nothing can be deduced from a single case, but I have thought the above relation might be useful in stimulating others to prosecute this subject more at length.

Softening of the heart clearly indicates the employment of bitters, tonics and steel. Wine is also indicated in this case, particularly if the affection supervenes to a severe fever, and if the patient bears it well.

Inflammation of the pericardium presents the same indications as pleurisy, to which I refer the reader; as does likewise the inflammation of the inner membrane of the heart and vessels. Acute inflammation of the substance of the heart, if it can be recognized, will furnish the same indications as pneumonia; and in regard to partial inflammations and ulcerations, if they could be ascertained, it is evident that all that we can do is to lessen the action of the heart by rest, bloodletting, and abstinence.*

The experience of both Corvisart and Hodgson proves that we ought not to consider aneurism of the aorta as absolutely incurable; and we know that the circulation may even be carried on after the obliteration of this artery. As soon, therefore, as we have recognized, or even suspected the existence of this terrible disease, we ought fearlessly to have recourse to the treatment of Valsalva. Only we must be careful not to induce syncope, particularly after the first bleedings, as this might prove fatal. Where the tumour shows itself externally, the application of ice to it may be beneficial, as in aneurisms of the limbs. The acetate of lead has been employed in Germany for some years past in cases of aneurism; and with alleged success. I am not aware on what principle this remedy was administered; but I had myself made previous use of it in diseases of the heart, and in obstinate hæmorrhages, owing to some observations I had made of the state of the bodies of subjects who had died while affected with colica pictorum. The only constant alteration I had found in these cases, were a great paleness of all the tissues, and a lesser quantity of blood than is usually met with. From these circumstances I suspected that one of the effects of lead on the system was to affect the formation of blood and thereby lessen its quantity. In giving this medicine I begin with a dose of three or four grains a day,—and I have not yet carried it beyond sixteen grains. I have continued its employment for several months, without producing colic, or any other symptoms of the saturnine disease. This remedy has frequently seemed useful, but I have never found it of very decided power.

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* One great principle always to be kept in view in the treatment of diseases of the heart, is entirely overlooked by our author, and can merely be glanced at by me in this place, although I am fully aware of its paramount importance: it is the removal of all disorder in other organs which can act as a source of irritation to the heart. In a former note, I briefly alluded to gastric irritation as a frequent concomitant (and indeed cause) of disease of the heart; and I would here add, that, from its powerful influence in stimulating the organs of circulation to increased action, its previous cure becomes essential to the success of our measures for remedying the disease of the heart. The same is true in diseases in other organs; but their influence is trifling, compared with that of disease of the digestive organs. I would, therefore, lay it down as a general rule in chronic affections of the heart, that, previously to having recourse to any remedies intended to act directly on it, we ought to be assured that the digestive organs are in a healthy state,—that their mucous surfaces are free from irritation,—their vascular system not morbidly distended, and that the liver is performing its secretory function freely and regularly. When derangements of this kind are present,—a few leeches to the præcordia or anus, some small doses of oxide of mercury and castor oil, a mild and spare diet, and bodily and mental repose, will often do more to tranquillize the circulation than more active and rougher treatment. And, indeed, in many cases, more especially in the earlier stages, when the stethoscope gives us but little information, it is not until we have restored the parts just mentioned to a comparatively healthy condition, that we can know how far the disordered action of the heart depends on sympathy with these, or is the consequence of incipient organic lesion of the heart itself. For valuable information on this subject the reader need hardly be referred to the popular writings of Mr. Abernethy, Drs. Wilson Philip, Johnson, Hall, Paris, Ayre, &c. as they are in every body's hands.

The young reader will do well also to study the works of M. Broussais, which, however disfigured by false theory and strained conclusions, are calculated to convey more valuable practical information to a certain class of English practitioners, than the writings of any other modern author. If he has not introduced, he has at least forwarded, in a most material degree, the vast improvement that has taken place, of late years, in the dietetic treatment of diseases; an improvement, a thousand times more valuable, than would be the addition to our materia medica of a thousand new remedies equal in powers to our best. From the manner in which the most powerful agents, remedial and dietetic, were formerly thrown into the stomach without any seeming reference to their primary action on the first passages, one would almost be disposed to think that the members of the profession still shared the opinion of its great founder respecting the nature and powers of these organs: "At vero venter a medicamento non exulceratur. Nam res est valida ac robusta, nimirum velut pellis et corium." De Morb. (Edit. Vanderlind.) p. 157.—*Transl.*

CHAPTER XXIX.

OF NERVOUS AFFECTIONS OF THE HEART AND VESSELS.

The study of pathological anatomy, in making us acquainted with the existence of important organic lesions in many cases, in which practitioners, too much addicted to the exclusive observation of symptoms, saw only cachexies, or alterations of the fluids, or at least nervous affections, has made us fall gradually into an error of an opposite kind: and among the present race of our pupils, many are as little disposed to acknowledge any nervous diseases besides the organic affections of the nerves, brain, and spinal marrow, as to admit any primary morbid changes in the fluids of the animal body. Nevertheless, we are bound to admit, that every disease in which we can discover no constant lesion of the solids nor evident alteration in the fluids, must consist in some disorder of the nervous influence. Of this class are several of the affections of the heart and arteries which I shall now notice.

Sect. I.—*Neuralgia of the Heart.—Angina Pectoris.*

It is by no means unusual to meet with persons who suffer, either constantly or by fits, from pains like those of rheumatism, or neuralgia, in the region of the heart, and which are improperly considered both by the patients and their medical attendants as signs of organic disease in this organ. Sometimes these pains are confined to this spot, but frequently they extend at the same time, or vicariously, over a greater or less portion of the lungs and stomach. Sometimes they exist simultaneously in the superficial cervical plexus, and extend along the tract of the branches supplied by this to the anterior parts of the thorax; still more frequently, at the very time they are felt most severely in the heart, they shoot with corresponding violence along the nerves of the axillary plexus, and more particularly along the brachial nerve to the elbow, and sometimes as far as the fingers. When this is the case, the affection is confounded with a nervous disease which, during the last twenty years, has been the object of much discussion, and seems to me only a variety of the neuralgia in question. This disease is the *angina pectoris*, which is very remarkable, and very distressing, when it exists in a high degree, but which is far from possessing the degree of severity attributed to it by many authors. It was taken notice of, as a separate disorder, for the first time, about the middle of the last century; and has since been much noticed by physicians, especially the English, who have considered it as essentially dependent on an organic affection of the heart. I shall discuss the correctness of this opinion after I have given an account of the symptoms characterising this disorder.

The *Angina Pectoris* is a spasmodic affection which returns in paroxysms, after longer or shorter intervals. The attack commences with a sense of pain, pressure, or constriction in the cardiac region or at the end of the sternum. There is at the same time a numbness, occasionally attended with pain in the left arm; rarely in both arms or in one half the body; more rarely still in the right arm only; and sometimes in all the limbs. The painful sensation is particularly felt on the inner side of the arm, as low as the elbow; and sometimes, as already mentioned, it shoots still further down. It is not unusual for the patient to suffer, at the same time, from pains over the fore part of the left chest; and in the female, these sometimes so affect the mamma that the slightest pressure becomes painful. Sometimes, particularly when the paroxysm is severe but short, the patient feels as if the same parts were pierced by iron nails or the claws of an animal. There are also pains in different points of the chest, dyspnœa, (in extreme cases suffocative orthopnœa,) violent palpitations, congestion of blood in the head, and sometimes syncope or convulsions. When the attack is over, the patient merely retains a slight feeling of these various symptoms, particularly the numbness of the limbs, the left more especially. Drs. Heberden and Parry concluded from some cases witnessed by themselves that angina pectoris depended on ossification of the coronary arteries of the heart;* an opinion in which they have been followed by Burns and Kreysig. This opinion has not been confirmed by subsequent observation; nevertheless the greater number of physicians, particularly in England, Germany, and Italy, have still retained the belief that the disease in question is always the effect of some organic affection of the heart, that this affection is one of great severity—and that most of the patients that are attacked with it, die suddenly. These notions are far from being correct.

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* Medical Trans. Vol. II. p. 59. Vol. III. p. 1. Inquiry into the Symptoms and Cause of the Syncope Anginosa. *Bath*, 1800.—*Author*. This is a mistake: Dr. Heberden did not so consider it.—*Transl.*

Angina pectoris, in a slight or middling degree, is extremely common, and exists very frequently in persons who have no organic affection of the heart or large vessels. I have known many individuals who had suffered a few very severe but short attacks of it, and had no further return of it. I am even of opinion that the prevalent type of disease influences its development, as I have some years met with it feequently, and hardly at all in others. On the other hand, it is certainly true that this affection frequently coincides with organic diseases of the heart; but nothing proves even then that it depends upon such diseases, inasmuch as they are of various kinds, and as the angina exists without any of them. I have examined several subjects who had laboured under this disease, and in whom there co-existed either hypertrophy or dilatation of the heart; and in none of these did I find the coronary arteries ossified. One of these died suddenly during an attack of angina; and such a result need not surprise us, when so severe a nervous affection co-exists (as in this case) with extensive hypertrophy. Dr. Desportes, in a dissertation published some years since,* has stated opinions very analogous to mine, respecting the nature and seat of this affection: he considers its site to be in the pneumo-gastric nerve. I conceive that the site of the disorder may vary, according to circumstances. For instance, when there exists, at the same time, pain in the heart and lungs, we may presume that the affection is principally seated in the pneumo-gastric; on the other hand, when there is simply a sense of stricture of the heart, without pulmonary pain or much difficulty of breathing, we may consider its site to be in the nervous filaments which the heart receives from the grand sympathetic. Other nerves are also simultaneously affected, either by sympathy or from direct anastomosis; for example, the branches of the brachial plexus, particularly the cubital, are almost always so; the anterior thoracic originating in the superficial cervical plexus, are also frequently affected; and this is also sometimes the case with the branches derived from the lumbar and sacral plexuses, as we find the thigh and leg now and then participating in the pain and numbness. I have even seen the affection confined to the right side of the thorax. In this case the pain and numbness extended to the arm, thigh, and spermatic cord of the same side, and the testicle became swollen during the paroxysms. There was scarcely any pain in the region of the heart; but the attacks were attended by severe palpitation, without any sign of organic lesion of the heart. The general character of the symptoms of the angina pectoris further confirms, by analogy, the correctness of the opinion here advocated; since we know the neuralgias of the most unequivocal kind, for example the sciatica and tic douloureux, give rise to the same kind and variety of effects as it does,—namely, acute pain, painful torpor, simple numbness along the tract of the nerve, and, sometimes, spasm or sub-inflammatory swelling of the parts to which it is distributed.[*]

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* De l'Angine de poitrine, 8vo. *Paris*, 1813.

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[*] In another place (*Cyclopædia of Pract. Med.* vol. i.) I have entered fully into the consideration of the history of the various congenerous affections which have been long classed under the name of *Angina Pectoris*. Referring to this, then, for more precise information, I must content myself with giving here a few observations which bear most closely on the more important statements in the text. Some of the most remarkable differences observed in cases of angina pectoris have reference to the physical condition of the parts immediately affected in the paroxysm; others to the state of the general system with which the local affection is connected. In one class of cases there exists great structural disease of the heart and aorta; in another class there exists either no structural disease, or none that can be detected. The former class of cases may therefore be termed *organic angina;* the latter, *functional angina.* Each of these classes may be subdivided according as the affection of the heart and aorta exists uncomplicated with other diseases of a general or local kind, or co-exists with some such disease or diseases on which it is more or less dependent. 1. The cases that come under the first subdivision of *organic angina* are few in number. They are those in which the anginous paroxysms seem to be the direct consequence of organic disease of the heart occurring in persons otherwise healthy. Cases of this kind are seldom very well marked, the anginous symptoms being either feebly manifested, or overpowered by the greater intensity of the more ordinary symptoms of heart-disease. These may be considered, in one respect, as the worst cases of angina, inasmuch as they hold out little prospect of cure or even of alleviation. 2. Under the next subdivision of *organic angina*, I would include the greater number of the best marked and more severe cases of this disease. In these, along with the organic affection of the heart or vessels, or both, (probably not very great, or, at least, marked rather by the paroxysm of angina than by the general symptoms of diseased heart,) we have some obvious general disorder of the system. In cases of this kind, the organic disease of the heart and aorta seems often to be a consequence of the co-existing disorder; if not a consequence, it is always greatly aggravated by its presence; and hence the most successful medical treatment of the angina is that which has direct reference to the concomitant disorder. 3. I consider cases in which the organic deviation is so slight as to be hardly discoverable, as constituting the greater number of those usually viewed by practitioners as examples of *pure functional* or *nervous angina*. It is obvious that in extreme strictness of language they are not entitled to this name; yet if the deviation is only so slight as to constitute mere feebleness, (and it is often nothing more,) they are probably as well entitled to the name as most other diseases commonly denominated nervous. But it must be admitted that in persons possessing the best proportioned hearts, and in which no deviation whatever from the normal structure can be detected either during life or after death, there may and do occur paroxysms of angina. The proportion of such cases is however very small under any circumstances in a state of uncomplication with other diseases; and I look upon them rather as of possible occurrence than as having certainly met with them in practice. Conjoined, however, with some other disorder, as in the next class of cases, we conceive they are by no means rare. 4. Under the head of *complex* or *sympathetic functional angina*, I must comprehend a large class of cases; and, for the reasons stated in the last paragraph, although not strictly philosophical, I would, for practical purposes, include under the present division all the cases of nervous angina complicated with other diseases, whether the organs of the circulation are perfectly sound and well proportioned, or only deviating in a very slight degree from this state of integrity. Under this head are comprehended a very considerable proportion of the cases met with in practice, and not a few of those which present symptoms of the greatest severity in the paroxysm.

The following tables of the statistical and other results derived from the examithe belief that the disease in question is always the effect of some organic affection of the heart, that this affection is one of great severity—and that most of the patients that are attacked with it, die suddenly. These notions are far from being correct.

Angina pectoris, in a slight or middling degree, is extremely common, and exists very frequently in persons who have no organic affection of the heart or large vessels. I have known many individuals who had suffered a few very severe but short attacks of it, and had no further return of it. I am even of opinion that the prevalent type of disease influences its development, as I have some years met with it feequently, and hardly at all in others. On the other hand, it is certainly true that this affection frequently coincides with organic diseases of the heart; but nothing proves even then that it depends upon such diseases, inasmuch as they are of various kinds, and as the angina exists without any of them. I have examined several subjects who had laboured under this disease, and in whom there co-existed either hypertrophy or dilatation of the heart; and in none of these did I find the coronary arteries ossified. One of these died suddenly during an attack of angina; and such a result need not surprise us, when so severe a nervous affection co-exists (as in this case) with extensive hypertrophy. Dr. Desportes, in a dissertation published some years since,* has stated opinions very analogous to mine, respecting the nature and seat of this affection: he considers its site to be in the pneumo-gastric nerve. I conceive that the site of the disorder may vary, according to circumstances. For instance, when there exists, at the same time, pain in the heart and lungs, we may presume that the affection is principally seated in the pneumo-gastric; on the other hand, when there is simply a sense of stricture of the heart, without pulmonary pain or much difficulty of breathing, we may consider its site to be in the nervous filaments which the heart receives from the grand sympathetic. Other nerves are also simultaneously affected, either by sympathy or from direct anastomosis; for example, the branches of the brachial plexus, particularly the cubital, are almost always so; the anterior thoracic originating in the superficial cervical plexus, are also frequently affected; and this is also sometimes the case with the branches derived from the lumbar and sacral plexuses, as we find the thigh and leg now and then participating in the pain and numbness. I have even seen the affection confined to the right side of the thorax. In this case the pain and numbness extended to the arm, thigh, and spermatic cord of the same side, and the testicle became swollen during the paroxysms. There was scarcely any pain in the region of the heart; but the attacks were attended by severe palpitation, without any sign of organic lesion of the heart. The general character of the symptoms of the angina pectoris further confirms, by analogy, the correctness of the opinion here advocated; since we know the neuralgias of the most unequivocal kind, for example the sciatica and tic douloureux, give rise to the same kind and variety of effects as it does,—namely, acute pain, painful torpor, simple numbness along the tract of the nerve, and, sometimes, spasm or sub-inflammatory swelling of the parts to which it is distributed.[*]

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The following tables of the statistical and other results derived from the exami-

Treatment.—The means which I have found most successful in relieving neuralgia of the heart, whether existing in so violent a degree as to be named angina pectoris, or only under the form of slight pains confined to the heart, are those formerly mentioned in the case of neuralgia of the lungs, and especially the magnet. This I use in the following manner: I apply two strongly magnetized steel plates, of a line in thickness, of an oval shape, and bent so as to fit the part,—one to the left cardiac region, and the other exactly opposite on the back, in such a manner that the magnetic current shall traverse the affected part. This method is not infallible, any more than others employed in nervous cases; but I must say that it has succeeded better in my hands in the case of angina than any other, as well in relieving the paroxysm, as in keeping it off.

nation of the more authentic published records of angina, are deserving the reader's attention. They are extracted from the same article.

Results relative to the sex of the patients.	
Total number of cases examined	88
Of these were, men	80
women	8
Results relative to the age of the patients.	
Total number whose ages are recorded	84
Of these were, above fifty	72
under fifty	12
Results relative to the event of the cases generally.	
Total number of patients, the event of whose cases is recorded	64
Of these there died (almost all suddenly)	49
Were relieved or recovered	15
Results relative to the event of the cases as regards sex.	
Total number of fatal cases	49
Of these were, men	47
women	2
Total number of cases cured or relieved	15
Of these were, men	11
women	4
Results relative to the existence of organic disease in general.	
Total number of cases of which dissections are given	65
Of this number there was no organic disease (except obesity) in	4
——— Organic disease of the liver only, in	2
——— Organic disease of the heart or great vessels, in	59
Results relative to the nature of the organic affections of the heart and great vessels	
Total number of cases in which there was organic disease in the heart or vessels	59
Of this number there was organic disease of the heart alone, in	10
——— Organic disease of the aorta alone, in	8
——— Organic disease of the coronary arteries alone, in	1
——— Ossification or cartilaginous degeneration of the coronary arteries in	16
——— Ossification or other disease of the valves in	16
——— Disease of the aorta (ossification, or dilatation, or both) in	24
——— Preternatural softness of the heart, in	12

Of the intimate nature of the pain in the paroxysm of angina we know nothing; we know no more of the nature of any pain. All that we can propound concerning it is a relation of the events which seem to lead to it, and the condition of the parts in which it occurs, at the time of its occurrence. We know that the pain is not of the kind which arises from inflammation, or ulceration, or any other fixed physical alteration of a part. All the circumstances attending it prove it to be of that kind

Magnetism was, perhaps, too much cried up by some medical men in the last century; but I am of opinion that it is too much neglected at present. That it acts on the animal system, is sufficiently proved by the fact of its giving rise not only to very obvious general effects, but even to local ones. In the case in question, after a certain time it most commonly produces an eruption of small pimples, which are sometimes so painful as to oblige us to interrupt the process for some days. This effect cannot be attributed to the action of the oxidized plates on the skin, as the eruption almost always takes place under the anterior one: and I have observed similar results from plates applied over the abdomen and loins. By means of these plates (applied to the epigastrium and spine) I stopped, at once, a hiccup which had lasted three years. At the end of six months, the patient having one morning neglected to put on the plates, the hiccup returned, but was removed upon their being replaced. In another case, in a patient affected with imperfect paraplegia, without any sign of structural lesion of the spine, and for which moxa had been used without success, I inserted, to the depth of half an inch, a needle near the vertebral column and another into the thigh, near the external popliteal nerve, and connected these by means of magnetized rods; and at the very instant of contact, there occurred an involuntary dejection, which had never previously happened to the patient. In the angina when the magnet gives but little relief simply, this is sometimes found to be increased on applying a small blister under the anterior plate.

During the paroxysm, if the oppression is considerable, we must bleed the patient, if he is at all plethoric. Leeches applied to the epigastrium or cardiac region sometimes give more relief than venesection; but sometimes their application is impracticable from the extreme agitation of the patient. Derivatives

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occurs in cramp or spasm, or from pressure, or in the class of cases termed neuralgic, in which the painful sensation is the result of some unknown temporary condition of the nerves of the part, not manifested by any physical alteration of them discoverable by our senses. We have sufficient evidence that such a morbid condition of the nerves may be produced in a heart in all other respects sound; and when it takes place in a heart manifestly diseased in its structure, we must consider the structural lesions merely as predisposing and exciting causes of the pain. That the structural lesions are not the immediate and necessary source of the pain is sufficiently proved by its intermitting character, and the perfect ease in the intervals, when the structural lesion is precisely the same as during the paroxysm. The anatomical structure, the peculiar action and functions of the heart and annexed great vessels, will sufficiently explain all the modifications of the pain and other phenomena observed in the anginous paroxysm. The radiation of the pain to a distance from the primary and principal site of it is only in conformity with what is observed in all other painful affections. Stone in the bladder produces pain in the glans penis; calculus in the ureter, pain in the abdominal walls; inflammation of the cartilages of the hip-joint, pain in the knee; and what is perhaps a still more appropriate illustration, irritation at the origin of nerves in general frequently manifests itself only by pain at their extremities. In a word, the pain, in the paroxysm of angina, may arise from neuralgia, from spasm, from over-distension; and the other principal phenomena may all, I think, be explained by the derangements of the functions of the heart, considered as a muscular organ charged with the office of circulating the mass of blood.—*Transl.*

are also beneficial, particularly sinapisms to the lower extremities and blisters to the fore-part of the chest; as are also antispasmodic medicines, with the infusion of cherry laurel or digitalis, and also the fetid gums. A mild regimen, with the use of the tepid or cold bath, according to the season, are among the best means for preventing a return of the paroxysm.[*]

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[*] As in the cases of many other of the diseases described in this work, the treatment recommended in angina is meager and indiscriminating. My space will not here allow me to supply the deficiency, and I must content myself with one or two general observations on the principles which ought to regulate our practice, referring for details to the article quoted in the last note. Like that of all diseases of an intermitting or paroxysmal character, the treatment of angina requires to be considered in two very distinct points of view,—in the paroxysm, and in the interval.—I. As there can be no doubt that the paroxysms of angina arise under very different conditions of the system, and as they differ very materially in their immediate causes, or in the condition of the organs immediately affected, all rational treatment must have regard to these circumstances in individual cases, as far as they are known or can be ascertained. Painful muscular spasm, or simple neuralgia of the heart and aorta, whether ultimately depending on organic disease of the parts or not, may recognize very opposite exciting causes, and may, therefore, be best relieved by different means. In one case, for instance, the patient may be strong and robust, and his whole vascular system overloaded; in another, he may be the victim of long previous disease, with a deficiency both of blood and constitutional power; while, in a third, the system may be comparatively healthy, with or without local disease of the organs of circulation, and with or without great nervousness of temperament. In all these varieties, the treatment will require modification to suit it to the individual case. When previously known, such circumstances must, therefore, be kept in mind by the practitioner; when not known, an attempt must be made to ascertain them before he prescribes for the patient. Inattention to circumstances of this kind has often rendered the treatment much less effective than it might have been, or has rendered it decidedly injurious. It must be confessed, however, that in many cases it is extremely difficult, if not impossible, to come to any certain judgment as to the actual pathological condition of the affected parts, or even of the system generally, during the paroxysm. A previous knowledge of the patient, and, yet more, the having had opportunities of studying the case in former attacks, will here be of the greatest importance.—II. If it is of consequence for the practitioner to be acquainted with the precise nature of the case before him, to enable him to prescribe successfully or even safely in the paroxysm of angina; it is much more important that he should have this knowledge to direct his treatment in the interval. In many cases, no doubt, it is quite impossible to ascertain the intimate character of the affection during the paroxysm; and in a certain proportion of these, the knowledge, if attainable, would be of little use. We should still be reduced to the necessity of applying the same limited stock of means without any very inspiring confidence of a beneficial result. Circumstances, however, are very different in the interval. Here, an accurate acquaintance with the nature of the individual case is indispensably necessary to enable us to institute treatment that holds out any prospect of success; while a practice adopted at hazard, or on merely empirical principles, may not only be useless, but may lead to the most disastrous results. The first and great object of the practitioner, therefore, on being called on to treat a case of angina, will be to make himself acquainted with its individual character. Beginning with the early history of the disease he will trace it to its present stage, and will endeavour, from the narrative of the patient, and from the observation of the whole phenomena presented to him, to form a clear judgment respecting the local condition of the organs in which the characteristic symptoms have their site; and the state of all the other parts of the system, which can in any way influence these: in other words, he must endeavour to ascertain the species or variety of angina, according to the distinction formerly pointed out. Are the paroxysms dependent on some structural lesion of the heart and great vessels, or are these organs in their original soundness? If there is any deviation from the sound condition of these organs, what is the nature of this deviation? Does structural lesion exist or not? or, if existing, can it be detected or

SECT. II.—*Of Palpitation of the Heart.*

In a former part of this work I took some notice of palpitations in general; I shall here consider those of a purely nervous kind, that is, such as exist without any organic lesion. These are frequently much more troublesome than the others. Far from being removed by the most complete repose, they are in general felt to be most distressing during the first part of the night. It frequently happens that they prevent sleep for several hours, while a moderate degree of exercise, proportioned to the patient's strength, removes or at least alleviates the distressing feeling of them. The purely nervous palpitations consist in an increase of the impulse, sound, and particularly of the frequency of the heart's pulsations. A feeling of internal agitation, particularly in the head and abdomen, always accompanies them; also a limpid watery condition of the urine. The duration of

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not? What is the actual physical condition of the heart? Are its walls thick or thin? Are its cavities large or small? What is the state of the general health? Is it such as injuriously to influence the recurrence of the paroxysms in any way, or to aggravate their severity? If thus injuriously influencing the local disease of the heart and great vessels, is it of a kind to be remedied or mitigated by medical treatment? These queries comprehend most of the subjects of inquiry which the practitioner who proceeds to treat a case of angina, must keep in view; and although it will sometimes be impossible to obtain precise information on every point, yet this will be practicable, in the greater number of cases, by care and attention and by the employment of the improved methods of investigating thoracic diseases furnished by auscultation. This latter method of exploration will, in a more particular manner, aid our recognition of the physical condition of the heart; and enable us, in a great number of cases, to determine the presence or absence of organic disease in that organ. This precise knowledge is, no doubt, important in assisting us to regulate our practice with the best advantage to the patient: but it is infinitely more so in enabling us to form an accurate prognosis respecting the event of the case. If the attacks recognize great structural lesion of the heart or aorta for their cause, we can only expect to mitigate the severity of the paroxysms, or to effect their temporary removal. If there exists no structural lesion of a fatal kind, although the organs may not be of the soundest proportions, it is often practicable, not merely to mitigate or remove the paroxysms, but by great and constant vigilance on the part of the patient in avoiding the exciting causes, to prevent their recurrence altogether. When the disease is purely one of functional disorder, a much more perfect and permanent cure may be expected. In all these cases, however, the general character of the treatment will not greatly vary. An organic lesion of the heart, even of an incurable kind, can only be viewed, in relation to the treatment, as a predisposing cause of the attacks, just as a heart that is naturally feeble or morbidly irritable is so: and it is only in rare cases that the organic lesion induces the paroxysm without the aid of obvious exciting causes. No doubt, exciting causes of a much feebler kind will suffice; but the very necessity of such causes at all to produce the effect, brings the case, as far as concerns the prevention of the paroxysms, under the same category as to treatment as the purely sympathetic or nervous angina. In the case of organic disease, however, our expectations of benefit from treatment, and the actual results, become wonderfully less. Now, indeed, we fight not for victory, but merely to keep the enemy at bay. We, however, use the same weapons; and if we do not strive with the same enthusiasm, we must, at least, be vigilant and active; and we shall often be rewarded with a degree of success that we scarcely dared to hope for at the commencement of our treatment.

palpitations of this kind is very variable: they may be momentarily excited by mental emotion; while, at other times, they seem to originate without any obvious cause, and continue for several years, especially in young persons who are at the same time both nervous and plethoric.—It is commonly imagined that such an habitual over-action of the heart as such palpitations imply, must at length give rise to hypertrophy of this organ. This is possible; but I must say that I have never seen any proof of the accuracy of this opinion. On the other hand, I am acquainted with individuals who have been habitually subject to affections of this kind, and who nevertheless exhibit no positive sign either of hypertrophy or dilatation.*

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* This seems in opposition to a statement formerly made in the chapter on the causes of *diseases of the heart*; it may be, nevertheless, and no doubt is, quite true.—(M. L.

I formerly took some notice of the signs which distinguish nervous palpitation from hypertrophy or dilatation of the heart: I shall here state them somewhat more precisely. In nervous palpitation, the first impression conveyed by the stethoscope is that the heart is not enlarged. The sound, though clear, is not heard loudly over a great extent of chest; and the impulse, although appearing considerable at first, is really not great, as it never sensibly elevates the head of the observer. This last sign seems to me the most important and certain of any, when taken in conjunction with the frequency of the pulsations. These are always quicker than natural,—being, most frequently, from eighty-four to ninety-six in the minute. Nervous palpitations are rarely accompanied by any sign of determination of blood to the head or chest, except in old persons.

The *treatment* of nervous palpitations consists principally in the employment of bathing—tepid or cool according to the season —the infusion of cherry-laurel and digitalis. Bloodletting ought to be employed with caution, and never unless the patient be young and plethoric: it is almost always injurious in such as occur in hypochondriacal and hysterical subjects. The same observation applies to a too rigid deit, which, like bloodletting, frequently increases the nervous agitation.

SECT. III.—*Of Spasm of the Heart, with the bellows-sound and purring thrill.*

I formerly showed that the bellows-sound of the heart, although frequently accompanying an organic affection of this organ, may exist without this, and be dependent on a simple modification of the nervous influence. But even in this case, it is always attended by symptoms which constitute a real state of disease. It is, generally speaking, in hypochondriacs, particularly such as are of a sanguine temperament and plethoric, that we most frequently observe the bellows-sound. And, in this case, it almost always exists in some of the arteries at the same time: frequently it passes from one to the other. It is sometimes continuous, sometimes intermittent: in the latter case, it recurs on the slightest agitation of body or mind experienced by the patient: even the act of breathing deeply or coughing suffices to induce it. The symptoms which accompany it, are the more severe in proportion as the sound is greater, more continuous, and extending to a greater number of arteries. When it is very constant and distinct, but confined to the heart, there is almost always more or less dyspnœa, with a feeling of greater or less debility, so that the patient can, in many cases, hardly walk. These symptoms are still more marked, if the purring-thrill accompanies the bellows-sound. There is commonly but slight nervous agitation, particularly when the patient is quiet; but on attempting to walk rather quick, or for any length of time, he is soon out of breath, and, in the severer cases, the head becomes confused. When this affection is not connected with organic lesion of the heart, the treatment ought to be the same as that of the nervous disorders of the arteries, which I now proceed to notice.

SECT. IV.—*Of Nervous Affections of the Arteries.*

Neuralgia of the arteries.—Pains more or less acute, continued or intermittent, sometimes follow the course of the arteries, and appear to have their site in the nervous filaments supplied to these vessels by the ganglionic system. These pains are, in general, less acute than those situated in the nerves derived from the brain or spinal marrow. They are particularly prevalent in hypochondriacs and hysterical women.—The means formerly recommended in the same affection of the heart and lungs, are the only ones applicable to the present case. The most efficacious is a blister over the affected part, when such an application is practicable.

Increased pulsation of the arteries.—This phenomena furnishes the best proof that the arteries have an action of their own, independent of that of the heart. It is thus by no means very rare to find the pulsation of one of the carotid or temporal arteries vastly greater than that of the other. A like difference is still more common in the radial arteries: it even exists in the state of health, in most men, the right pulse being almost always stronger than the left. Does this depend on the right arm being more exercised than the left? I have sometimes observed, during the course of a disease, the radial arteries become alternately stronger and weaker; or the left become the stronger of the two, although the contrary had been the case in health. This morbid degree of impulse is not at all unusual in the aorta, particularly in the ventral portion of it. A sense of fulness always attends this augmentation of impulse, the affected artery seeming to be always as full as possible, and more than the other parts of the arterial system.

When this phenomenon exists only in a single artery of a small or middling size, it is attended by no obvious alteration of the health,—except in the case where it is occasioned by inflammation of the part on which the vessel is distributed; as when the arteries of the arm are excited by a whitlow. Augmented impulse of the carotids usually accompanies nervous affections, but does not always exist in subjects either threatened or affected with apoplexy. Nervous palpitations of the heart are sometimes accompanied by a similar agitation of the whole arterial system, the patient being sensible of the arterial action over the whole body; and sometimes this is visible, even in the smaller vessels.

In the case of the aorta, these nervous phenomena are always conjoined with a more or less painful affection of the general system,—even when they are confined to one portion of this artery. When seated in the ascending aorta they are accompanied with some degree of oppression in the breathing, and yet more with a sense of anxiety and tendency to syncope.—We recognize this affection by the pulsations heard above the middle of the sternum, being stronger and more sonorous than those heard in the cardiac region,—the sternum at the same time yielding the natural resonance on percussion. The symptoms are nearly the same when the descending aorta is the part affected; and the affection is distinguished by the pulsations of the heart appearing more audible in the back, especially the left side, near the spine, than in the region of the heart itself. In this situation, indeed, they are most commonly quite natural, both in respect of sound and impulse; whilst in the back, the sound of the diastole of the arteries being confounded with that of the ventricles, makes this seem much stronger,—the sound of the auricles being at the same time less than on the fore-part of the chest.

In the ventral aorta, the phenomenon is much more frequent still, and may often induce the belief of aneurism. I have several times seen this error committed; and it, in truth, is easily fallen into, when the accumulation of gas in the duodenum or colon simultates the aneurismal tumour. I made the mistake myself in one case; but I have since been enabled to distinguish several others of the same kind chiefly by this circumstance—that, in the case of aneurism, we cannot by examination ascertain the natural calibre of the artery, which we can do in the nervous affection, with the greatest ease, more especially by means of the stethoscope. There is no other way of accounting for the formation and disappearance of swellings of this kind, but by the supposition of air confined in some manner within one of the cells of the colon. And yet it is singular that such swellings will, as I have myself observed, last for months, and then disappear. These are the cases in which practitioners boast of resolving palpable *obstructions;* or else they are tumours containing vesicular worms, which, on dying, contract into so small a space as to be no longer perceptible.

Spasm of the arteries, with the bellows-sound and purring-thrill.—When the bellows-sound of the arteries exists only in one vessel of a small or middling size, more particularly if it is intermittent, it is connected merely with a degree of nervous agitation, often very slight, and with a frequency of pulse, either habitual or produced by the slightest exertion. It is especially in young plethoric hypochondriacs that it exists in this degree. In this case it is usually seated in the subclavians, more rarely in the carotids, and more frequently in the right than in the left. In rare cases it is met with in fevers; it is by no means unusual in disease of the heart; and it is still more common in nervous palpitations. When the bellows-sound exists in the aorta, particularly the ventral portion of it, there is always a marked state of disorder in the nervous system, viz. agitation and anxiety, faintings more or less complete, and produced by the slightest causes, or even without any obvious cause; and an habitually quick pulse. When both carotids are affected at the same time, and there co-exists the purring thrill, the same symptoms are present, but in a somewhat less degree. In both cases, we can almost always excite the bellows-sound artificially in the crural and brachial arteries, in the manner formerly pointed out. When the phenomenon is present at the same time in the heart and aorta, and in the carotid, subclavian, brachial, and crural arteries, there is extreme anxiety, oppressed breathing, frequent pulse, and sometimes a feeling of internal heat, without any other sign of formal fever. This condition of the system is always important, and may, I conceive, of itself produce death. When the bellows-sound is very intense and exists in a great many arteries at the same time, the purring-thrill is commonly perceptible in some. This phenomenon, however, appears to have no fixed relation either to the intensity or extent of the bellows-sound, nor to the severity of the disease. I have sometimes observed it very distinct in one of the carotids, although the bellows-sound in it was very feeble; on the other hand, I have never met with it in the heart, without the other being very intense.

In a great number of cases in which the bellows-sound exists in some of the arteries, the pulse at the wrist has a particular sort of trembling, exactly analogous to that of a vibrating cord. This character of the pulse is probably that observed by Corvisart in ossification of the mitral valves, when the purring-thrill exists in the cardiac region; and indeed it would seem to be merely a sort of diminutive of the latter phenomenon. I have, however, most frequently met with it in cases in which the bellows-sound existed in some of the arteries, without the purring-thrill; but I have met with it, when this latter was also present, either in the heart or arteries. I have sometimes also found it when neither of these phenomena was perceived; but in this case the purring-thrill could always be excited in the brachial and cural arteries by means of the interrupted pressure formerly mentioned, and in the subclavian and carotids, by making the patient walk quickly, cough, or breathe deeply. For these reasons I am induced to consider these three phenomena, as different modifications of each other.

Treatment.—In augmented impulse of the arteries, bleeding is decidedly indicated, and we frequently can only obtain relief by having recourse to this repeatedly and extensively. There is not so much cause for this treatment when there exists only the bellows-sound without increased impulse. In both cases tepid bathing, especially in the form of the shower-bath, is very beneficial. I have also derived advantage from the magnet, when the affection was confined to the heart, but less frequently than in angina. The infusion of digitalis and lauro-cerasus have not been found of much benefit. In the simple bellows-sound uncomplicated with increased impulse, more particularly in pallid cachectic subjects, steel, the fetid gums, and castor, have occasionally proved useful. A moderate diet and abstinence from all kinds of stimulants, ought, in every case, to be enforced.

END OF THE TREATISE.

APPENDIX.

OF THE APPLICATION OF AUSCULTATION TO OTHER CASES BESIDES DISEASES OF THE CHEST.

SECT. I.—*Of the Diagnosis of Pregnancy.*

IT had never occurred to me to apply auscultation to the study of the phenomena of gestation. For this happy idea we are indebted to Dr. Kergaradec, who hit upon it while verifying the facts contained in the first edition of this work. His first researches were made on a woman very near her confinement. He obtained two results, which may now be considered as the most certain signs of pregnancy. These are—1. The pulsation of the heart of the fœtus; and 2. a sound denominated by its discoverer, *simple blowing pulsation* (battement simple avec souffle) or *placental sound*, from a belief that its site is in the placenta or in the part of the womb to which this is attached: it is evidently an arterial pulsation accompanied with the bellows-sound.*

The action of the fœtal heart is marked by double pulsations like those of the adult, only much more rapid, being usually twice as quick as that of the pulse of the mother. These pulsations are distinctly audible in the sixth month, and sometimes even a little earlier. The place over which they are perceptible varies with the position of the fœtus: commonly it is pretty extensive. The space of pulsation is frequently near a foot in length and three or four inches in width; but it is always easy to determine the precise point of pulsation, from the increased or diminished intensity of the sound as we approach or recede from it. It is probable that the space over which we hear the sound is greater in proportion as the fœtus is near the membranes, in other words, as the liquor amnii is small in quantity. Sometimes the sound becomes inaudible for hours, or even whole days: perhaps, sometimes, on account of the temporary feebleness of the action of the fœtal heart, but still more frequently, in all probability, owing to the recession of the fœtus from all contact with the membranes. It is evident that, in order to render the sound fully audible, the body of the fœtus, the membranes, the uterus, and the abdominal parietes of the mother must be in immediate contact. A turn of intestine placed between the walls of the abdomen and the uterus, is sufficient to prevent the sound from being heard; and the waters of the ovum being a worse conductor than the solids, must also be an impediment, when they exist in too great a quantity between the membranes and fœtus.

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* Mémoire sur l'Auscultation appliquée à l'étude de la grossesse, par M. Le Jumeau de Kergaradec, D.M.P. *Paris*, 1822.

This sign is of a kind the certainty of which cannot be doubted, and which cannot be simulated by any thing else; for although we certainly can sometimes hear the sound of the mother's heart, on applying the stethoscope to the epigastrium, the lateral parts of the abdomen or loins, the extreme difference of frequency between the pulsations of the mother and fœtus, renders the mistaking the one for the other quite impossible.*

The excitement of the mother's circulation has no effect, at least not a constant one, on the action of the fœtal heart. On one occasion while M. Kergaradec was exploring the fœtal heart, the pulsations of this became suddenly too quick to be counted, while the pulse of the mother continued of the usual degree of frequency. After a short time, the fœtal pulse recovered its usual frequency, which varies from one hundred and twenty to one hundred and sixty. I had occasion to witness something similar. All at once the sound became extremely loud, almost equal to that of the heart of an adult, but without any impulse or change in the frequency or rythm. This state lasted only a few seconds; and was not accompanied by any particular emotion in the mother.

The second phenomenon discovered by M. Kergaradec is evidently an arterial pulsation, isochronous with the pulse of the mother, and accompanied with the bellows-sound. It is unattended by any impulse. The point where it is heard, is always fixed in the same individual, but varies in each person: and the abdominal space over which it can be heard is usually less than in the case of the fœtal sound. Most commonly this space is only three or four inches square; but sometimes it is considerably larger.

These pulsations have presented to me nearly all the varieties of the bellows-sound. It usually becomes perceptible about the fourth month. As soon as the uterus has risen above the pelvis, and can be brought in contact with the walls of the abdomen by pressure on them with the stethoscope, we hear the sound very distinctly—perhaps even better than at the end of the period of gestation. At the earlier period the sound is somewhat peculiar. It seems as if a blast from the bellows were discharged into an empty bottle. Later in pregnancy, the bellows-sound is almost always dull, much diffused, and conveying no impression of being limited to the calibre of an artery. From the observations of Dr. Kergaradec and others, the sound would appear to originate from the point of insertion of the placenta. It is highly important, in a practical point of view, that this fact should be fully verified. The bellows-sound is usually heard on the side opposite to that in which the fœtal pulsation is perceived; but this is by no means constant.

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* M. Mayor, of Geneva, had heard the pulsation of the unborn fœtus, previous to M. Kergaradec, as appears from the following note in the *Bibliothèque Universelle* for November, 1818, *Geneva*. "M. Mayor has discovered that we can ascertain with certainty if the fœtus has nearly arrived at its full time, or if it is living or dead, by applying the ear to the abdomen of the mother; if the child is alive, we can hear distinctly the pulsations of its heart, and can readily distinguish them from those of the mother." (This note is by the Editor, in the notice given of the Report of M. Percy on "*Mediate Auscultation.*") It does not appear that M. Mayor has prosecuted his researches further, since nothing has appeared from him since the publication of M. Kergaradec.—*Author.*

I am of opinion that the sound in question does not originate in the placenta itself. The only arteries in which it can be supposed to be produced are the hypogastric, iliac, and uterine. If the two first were the site of it, we ought to hear it on both sides of the uterus at once, or alternately in the same individual, which is not the case. If all the uterine arteries yielded it, we ought to hear it in different points, and in several at the same time. What seems to me most probable is, that it exists in the chief artery distributed to the placenta. The following statement was communicated to me by Dr. Ollivry, an experienced accoucheur, to whom I had sent an account of Dr. Kergaradec's discovery. "I have proved on four women the accuracy of the observations you communicated to me. And I have further ascertained, by the introduction of the hand into the uterus, immediately after parturition, that the point where I had previously heard the *blowing pulsations*, corresponded exactly with the point in which the placenta was implanted. I am so satisfied of the truth of this observation, that I do not intend to repeat the experiment, which, by the way, is rather painful to the patient. If a fresh proof were wanting that the cause is what you have stated, it is found in the fact, that the sound ceases *the very moment the unbilical cord is cut.*" I agree with Dr. Ollivry in considering this last fact as quite conclusive; and even if it should happen that we are not able hereafter to determine more positively the precise seat of this variety of the *bellows-sound*, it is at least certain that it originates in the place to which the placenta is attached, and that it is connected with the action of its vessels: it will still, therefore, be justly named the *placental sound.* This sound is not constant; it being at times scarcely perceptible for days together. No doubt the interposition of a portion of intestine between the arteries and the abdominal parietes may sometimes render the sound imperceptible; but we often hear it cease and return again while the instrument remains fixed in the same spot.

In the case of two or more fœtuses, it is evident that we shall hear an equal number of fœtal hearts. After the birth of one fœtus, we can, by the same means, ascertain if there is one behind. Since the publication of Dr. Kergaradec's memoir, I know an instance in which the existence of two fœtuses was ascertained some days before parturition.

Besides the advantage of being able to ascertain the attachment of the placenta, it is very probable, as M. Kergaradec has remarked, that auscultation may enable us to form some judgment of the position of the fœtus previously to the dilatation of the os uteri. This judgment will be founded on the fact that owing to the bent position of the fœtus in utero, the sound of the heart must be much more distinct over the back than over any other part that comes in contact with the uterine walls. It may also be expected that some light may be thrown by this means on cases of extra-uterine conception: but I know of no fact in support of this opinion.

The study of the phenomena we have been discussing, demands infinitely more attention than that of those which indicate disease within the chest. The sounds being very feeble, the utmost silence is necessary during the time of observation, and the utmost care must be taken to discriminate the sounds in question from several others, which are likely to exist at the same time,—for instance, the sound of the mother's heart,—the sound of the intestinal contents, and the sound of muscular contraction, produced by the force necessarily used to compress the abdominal parietes with the stethoscope. It is sometimes requisite to bestow much time on our observations, and to repeat them, on account of the intermittent character of the phenomena we are investigating.*

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* No one who is aware of the frequent and great difficulties experienced by practitioners in detecting pregnancy, and of the vast importance of doing so in some cases, will have any doubt of the great value of the auscultatory signs noticed in the text. They are almost as certain as the perception of the fœtal movements, and more certain than *the touch*; and they possess a very great superiority, in point of convenience and delicacy over the latter. It is true, they have not been detected in some cases of pregnancy; it is probable that, owing to some peculiar idiosyncracy, they may never manifest themselves in certain cases; but ample experience proves that their absence is a circumstance of extreme rarity. Their absence, therefore, must not be considered as an absolute test of the non-existence of pregnancy; although their presence may be looked upon as the reverse. Here, as in every other case in which auscultation is applied, we have all the other signs to guide our judgment in the instances where the fœtal and placental sounds are not detected; while in the vast majority of cases, we have an additional sign, of almost infallible accuracy. It cannot, therefore, be denied that this form of physical diagnosis has conferred even on puerperal medicine a boon of immense value. For much more complete and precise information on the subject of this section, see Dr. Ferguson's Memoir in the Dublin Med. Trans. vol. i. New Series, entitled "Auscultation the only unequivocal evidence of Pregnancy;" and Dr. Kenedy's excellent treatise on *Obstetric Auscultation*. (Dublin, 1833, 8vo.) See also Dr. C. Haus's little work, "Die Auscultation in Bezug auf Schwangerschaft" *Wurtzburg*, 1823; and Dr. Montgomery's article, "Signs of Pregnancy," in the Cyclopædia of Pract. Med. vol. iii.—*Transl.*

SECT. II.—*Of the diagnosis of other diseases besides those of the chest.*

I had been long of opinion that auscultation might be usefully applied to different surgical cases, and particularly to the diagnosis of urinary calculi and doubtful fractures; but I had no leisure or opportunity of putting my ideas in practice. This defect, however, has been admirably supplied by M. Lisfranc, who has lately published a series of observations and experiments, which leave no doubt on the subject, and fix, in a precise manner, the signs by which doubtful cases of the kind may be recognized.* I shall here give a brief account of these.

1. *Fractures.*

The stethoscope applied over the place of fracture, on the slightest motion of the part, conveys a much more decided crepitus, than is perceived by the naked ear during the most extended movements of the parts. In many cases, even the slight pressure of the ear on the stethoscope suffices to produce the crepitation; a circumstance of no small importance, as freeing the patient from the pain necessarily excited by the motion requisite in the manual examinations. The crepitus yielded by the more solid bones is sonorous, and resembles the sound produced by breaking a piece of wood across the knee; it is accompanied with a sensation of roughness unpleasant to the ear. The sound yielded by the spongy bones is duller, and resembles the effect of a rasp on wood; except that, now and then, this noise is broken by sounds of a clearer kind, like those afforded by the compacter bones, only not so loud. The crepitous is loudest over the place of fracture, and gradually diminishes as we recede from this; but it may be heard at a great distance from the fracture, when this is in the compact part of a long bone. In the case of fracture of the femur, the crepitation may be heard even on the skull. From this it will appear, that the precise place of the fracture is easily ascertained. The sound from oblique fractures is stronger than from those which are transverse; but when one end of the fractured bone *rides* the other, the sound is then obscured, and in some cases may not be perceived without slight extension or counter-extension of the limb. If the fracture is comminuted, the sensation, as of distinct portions of bone, is conveyed by the stethoscope.

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* Mémoire sur de nouvelles applications du Stethoscope, par J. Lisfranc.—Now translated into English, with notes, by Mr. Alcock.—*Transl.*

The more that auscultation is applied to different objects, we shall find, in general, that the more is the tact of the ear improved, so that it reaches a degree of delicacy that is quite surprising. We formerly saw that, in several diseases of the chest, it conveys the sensation of humidity and dryness, of form and extent: in the case of fractures of the bones of rabbits, I have been able to distinguish whether the bones were sharp or blunt, or comminuted; when the hand, on account of the thickness of the soft parts, could only do so in an obscure and doubtful manner. When fluids are effused around the fracture, a guggling is combined with the crepitation; and which is compared by M. Lisfranc to the sound produced by a shoe full of water. When the fracture is compound, there is conjoined with the crepitation, a sound of blowing, something like the sound of forced respiration, made with the mouth open. It is impossible to confound the sound of fracture with that of luxation: in the latter case, the sound is dull and obscure, and conveys precisely the impression of two moist and polished surfaces sliding over one another.

From the preceding observations it results, that, by means of the stethoscope, we may readily, and without giving pain, distinguish every species of fracture, even those of the most doubtful kind—for instance: those of the neck and condyles of the femur, —of the fibula, particularly at its lower end,—of the internal malleolus,—of the rotula, longitudinal and oblique,—of the radius and ulna, when only one of these is fractured,—of the neck and condyles of the humerus,—of the acromion process of the scapula,—of the outer end of the clavicle,—of the scapula and ribs,—of the vertebræ,—and finally, all fractures accompanied with considerable swelling of the surrounding soft parts, which is especially the character of those in the vicinity of the joints. In all these cases, the stethoscope applied over the fractured part, will convey the crepitus, on the slightest movement of the part, or even, as already stated, by the simple pressure of the instrument. When from the great thickness of the surrounding soft parts (augmented, perhaps, still further by inflammation) the sound is obscured, it becomes more perceptible upon applying the instrument on the point of the bone that lies nearest the skin, on the principle of solid bodies being better conductors of sound than soft ones; thus in fracture of the neck of the femur, we apply the instrument upon the trochanter or crest of the ilium.

2. *Urinary calculi.*

The introduction of the catheter or sound is, unquestionably, an excellent means of ascertaining the presence of calculi in the bladder; nevertheless the sensation produced by its contact with the stone is sometimes indistinct; and it has certainly happened to the most expert surgeons to perform the operation, when there existed no stone to be extracted. This circumstance need never again occur if the stethoscope is employed in all doubtful cases. —When the stethoscope is applied to the os pubis or sacrum while the catheter is introduced, we hear the sound occasioned by this coming in contact with the stone, much more distinctly and loudly than we can do with the naked ear; and, indeed, even in the obscurest cases, the sensation communicated will be quite as distinct as would be that produced in the open air by striking the instrument, even much more forcibly, against a stone.—When the bladder contains no stone, after the urine has nearly all escaped, we perceive a guggling sound like that produced by churning saliva between the teeth when the mouth is closed. When the bladder is completely empty, the motion of the catheter backwards and forwards, gives rise to a noise like that of the working of a pump.—It is well known that the celebrated Desault mistook a fungous tumour of the bladder for a calculus. M. Lisfranc, in order to ascertain whether this mistake could occur with the stethoscope, introduced pieces of flesh into the bladder, and found that no other sound was produced than arises when the bladder is empty.

3. *Abscess of the liver.*

In the case of abscesses or hydatid cysts in the liver, when opened into the stomach or intestines, or into the lungs, I conceive the stethoscope may tend to supply us with diagnostic marks. In the two cases first mentioned, pressure on the right hypochondre will probably occasion a guggling sound from the introduction of the intestinal gases into the excavation in the liver. In the latter cases, if the abscess communicates with the bronchia, we ought to have the cavernous rhoncus, cough and respiration, perhaps even pectoriloquy, and the metallic tinkling.

4. *Diseases of the tympanum and Eustachian tube.*

If we apply the stethoscope upon the mastoid process of the temporal bone, while the patient inspires forcibly with the nostril of the same side, (the other being closed with the finger,) we perceive a blowing sound indicating the penetration of air into the mastoid cells. If there is any moisture in the Eustachian tube or tympanum, we perceive a guggling very like that of the mucous rhoncus, and if the mucus happens to obstruct the tube, all sound ceases. From this and other analogous facts, we may ascertain the patency or obliteration of the Eustachian tube, and may thus be enabled to determine more particularly the cases in which it is proper to attempt curing deafness by throwing injections into this, or by perforating the membrane of the tympanum.*

5. *Use of auscultation in veterinary medicine.*

Although I think auscultation may be found of use in the diseases of animals, I do not expect that it will ever be so in the same degree as in man. In the first place, in them we lose at once all the signs supplied by the voice. But there are likewise many other obstacles to the use of the stethoscope in animals. In the larger quadrupeds, such as the horse or bullock, the exploration of the heart becomes extremely difficult, on account of the inconvenient posture necessary to attain it, and on account of the form of the sternum. In the horse, and probably in all herbivorous animals, the respiration is very indistinct, being indeed hardly audible, even when the animal has just ceased running. I am, however, of opinion, that in the state of disease it would be more perceptible in the sound portions of the lung, the action of which is, in such case, doubled or tripled; and accordingly, I found, in one case, that it was as easy to recognize peripneumony in a cow, as in the human subject. I ought to add, that my researches on auscultation in the diseases of animals have been very limited, but I am still of opinion, that it will be found very useful in such cases, more especially when conjoined with percussion.†

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* The author further suggests the probable utility of the stethoscope in the instruction of the deaf and dumb, by applying one end of it to the trachea of the speaker and the other to the ear of the pupil;—but surely this must be fanciful,—or at least of inferior value to other means.—*Transl.*

† The two following bibliographical articles, having reference to the whole of the two great subjects to which this treatise is devoted, are inserted together, in this [illegible]

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PLATE I.

Fig. 2

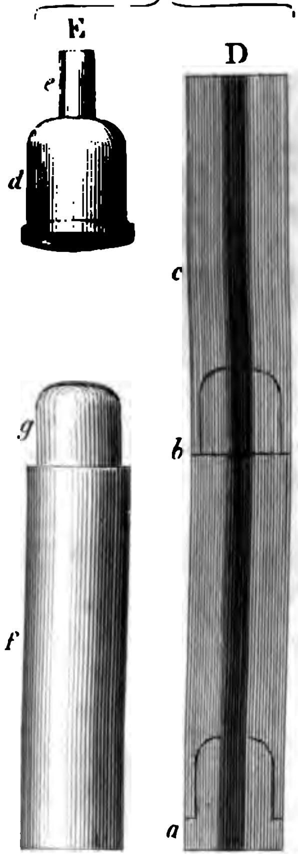
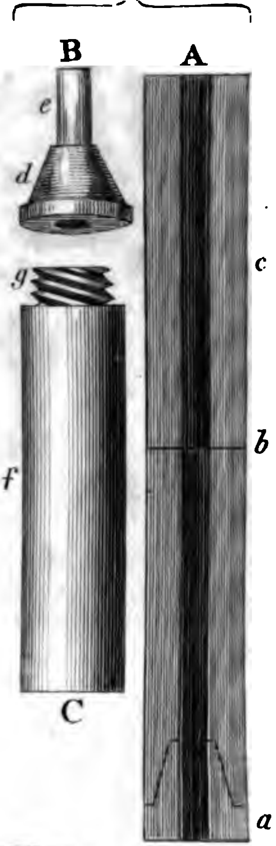


Fig. 1



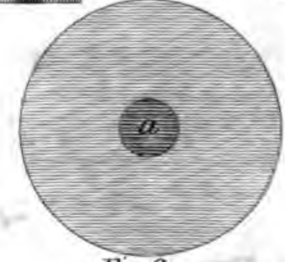


Fig. 3

EXPLANATION OF THE PLATES.

PLATE I.

FIG. 1. (A. B. C.)—*The Stethoscope as delineated in the first edition of Laennec's treatise, published in* 1819.

A. Longitudinal section of the stethoscope reduced to one-third its actual dimensions.

a. The plug or stopper in its place. *b.* The point of union of the two parts. *c.* The upper or auricular half.

B. The plug or stopper removed. *d.* The body of it formed of the same wood as the rest of the instrument. *e.* Small brass tube traversing the stopper for fixing it in the tube of the stethoscope.

C. The upper portion of the stethoscope. *f.* The body of it. *g.* Screw, cut in the wood, for uniting the two parts together.

FIG. 2. (D. E. F.)—*The Stethoscope, as altered by Laennec, and delineated in the second edition, published in* 1826.

D. Longitudinal section of all the parts united, one-third of the actual dimensions. *a.* Stopper in its place. *b.* Point of junction of the two parts. *c.* Upper or auricular half.

E. The stopper removed. *d.* Its body, made of the same wood. *e.* Brass tube for fixing it into the base of the stethoscope.

F. Pectoral or lower half of the stethoscope. *f.* Its body. *g.* Its upper extremity reduced so as to fit the cavity in the other half; directed to be covered with thread or leather, in order to make it fit accurately.

FIG. 3. Actual diameter of the stethoscope (both varieties). *a.* Diameter of the bore.

PLATE II.

FIG. 1. (A. B.)—*The Stethoscope as now in most common use, being a modification of the two forms proposed by Laennec.*

In this modification, the *extremity* only of the plug (B, *c.*), and consequently its containing cavity, are made conical, according to the first form of Laennec, while a portion is left of equal diameter (B. *b.*) to enable it to retain its hold, without the brass tube

A. The whole instrument with the two portions adjusted and the plug infixed, drawn so as to exhibit both its exterior and interior configuration. (The figure in the plate is not drawn of the exact proportions of the instrument, being only about *one-fourth* of its length, while it is *one-third* of its diameter.) *a.* The plug in its place. *b.* The upper half of the instrument. *c. c.* Rims of ivory or horn surrounding the pectoral extremities of either half. *d.* A cap of the same material surrounding and covering the whole auricular extremity of the instrument. *e.* The central bone.

B. The stopper (constructed to fit either the upper or lower half of the instrument) removed. *a.* Portion exterior to the funnelled cavity when the plug is in its place, of the same diameter as the stethoscope. *b.* Outer portion of the plug, of equal diameter throughout. *c.* Conical portion of the plug.

FIG. 2. (A. B. C. D. E.)—*Piorry's Stethoscope and Pleximeter.*

This *stethoscope* is constructed exactly on the same principles as that of Laennec, but with several modifications, intended to render it lighter, smaller, and more portable. In it the central bore and conical cavity of the pectoral extremity, are preserved of the original dimensions, but the body of the instrument is greatly reduced in size, and the proper width is given to the auricular extremity by screwing a thin ivory cap to the slender body of the instrument. The *pleximeter* is attached to the stethoscope merely with a view to render the former conveniently portable.

A. The whole stethoscope with the plug included, and the pleximeter attached, as carried in the pocket.

a. The body of the instrument, of one-fourth the actual size.

b. Its auricular extremity of ivory, and with a screw for attaching it to the auricular cap D.

c. Its pectoral extremity.

d. The pleximeter, of ivory, screwed upon the body of the stethoscope, and shutting in the plug E.

e. The auricular cap D. screwed upon the pleximeter.

B. An additional portion of cylinder fitted to screw on A. at *b.*, for the purpose of lengthening the instrument, when one of a greater length is preferred.

C. The stethoscope fitted for use, the pleximeter being removed and the auricular cap (D.) applied. *a.* Auricular cap screwed upon the cylinder. *b.* The pectoral extremity freed from pleximeter and cap.

D. The auricular cap removed, interior view.

E. The plug or stopper removed.

FIG. 3.—*Piorry's Pleximeter (connected with the Stethoscope.)*

a. Internal screw for attaching it to the end of the stethoscope. *b.* External screw, in which the auricular cap is fixed.

FIG. 4.—*Piorry's Pleximeter* (*not connected with the Stethoscope.*)

a. Handles turned in the ivory.

This little instrument is made of ivory, from an inch and a half to two inches in diameter, and about one-sixth of an inch in thickness. It may be made either circular or ovoid.

N.B. All the instruments can be accurately constructed by any good turner from the foregoing descriptions. Dr. Williams recommends Grumbridge, turner, 42, Poland-street, Oxford-street, London, as the best manufacturer of stethoscopes. The best kind of wood for the purpose is fine pencil cedar. The principal nicety consists in making the bore perfectly even and smooth.

LONDON:
IBOTSON AND PALMER, PRINTERS, SAVOY STREET, STRAND.

CRITICAL NOTICES

OF THE

SECOND EDITION

OF

DR. FORBES'S TRANSLATION OF LAENNEC.

I.

Medico-Chir. Review, Jan. 1828, pp. 105, 106.

THE present edition possesses many and great advantages over the former. It is much enlarged and improved in every respect. The arrangement is infinitely superior, the pathological descriptions are more complete, the diagnostic signs more correctly stated, and the limits and practical utility of Mediate Auscultation more clearly defined. The *treatment* of the different diseases is also added in the present edition; and the work must now be considered as a very complete treatise on the pathology, diagnosis, and method of cure of the diseases of the thoracic viscera......... With respect to Dr. Forbes's translation, it has our most unqualified praise. He has not only given a complete version of the present edition, but has enriched the original matter with copious and valuable notes. And it may be stated generally, that where Laennec's account of any disease is incomplete, Dr. Forbes has either added what was wanting, or has indicated the sources whence more full information may be obtained.

II.

Edinburgh Med. and Surg. Journ. April 1828, pp. 407, 408.

The translation is clear, faithful, and accurate throughout. The language is plain, unassuming, and sufficiently good for the purpose. And Dr. Forbes has undertaken and completed his task like one who knows not only the language but the subject of his author. He has not confined himself to the mere task of slavish translation. He has exercised his discretion in omitting such parts as are either mere refinements, or points which, though curious, possess little or no practical utility. On the other hand, Dr. Forbes has increased, in no ordinary degree, the value of the work of M. Laennec, by various additions in the form of notes.

III.

Glasgow Med. Journ. No. I. Feb. 1828, pp. 61—64.

Every page proves the cautious spirit of induction which regulated his (Laennec's) investigations, and shows that his recommendation of the stethoscope arose, less from the partiality of an inventor, than from the deliberate approval of a candid inquirer. None will dare to deny that he has produced the most complete treatise on diseases of the chest, which exists in any language........ The translations of Dr. Forbes seem to be executed with judgment and accuracy.

IV.

Med. Repository, Jan. 1828, pp. 56, 57.

The chief value, and that is great, of the work of M. Laennec, consists in the minute and accurate description of the anatomical characters of the diseases which it comprehends, and of those signs which he has found, during a very extensive and persevering practice, to be pathognomonic of each disease. That he has given rise to a new era in the mode of exploring the functions of the thoracic viscera, both in health and disease, must be fully admitted, as a just tribute to his memory.... Having said thus much of the author, it is but just that we should pay our [illegible] thanks to the translator, for his share of the labour. We have not the pleasure of knowing Dr. Forbes personally; but, judging of his talent and literary acquirements from the proof which he has given to the public, we feel assured that the present work could not have fallen into more able hands for translation. The style is [illegible] classical, and the notes contain many valuable remarks on different subjects treated of in the body of the volume.